

ORIGINAL  
(Red)

R-585-9-5-28

A FIELD TRIP REPORT FOR  
LEVITTOWN DUMP  
PREPARED UNDER

TDD NO. F3-8504-12  
EPA NO. PA-282  
CONTRACT NO. 68-01-6699

FOR THE  
HAZARDOUS SITE CONTROL DIVISION  
U.S. ENVIRONMENTAL PROTECTION AGENCY

JANUARY 9, 1986

NUS CORPORATION  
SUPERFUND DIVISION

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SECTION 1

## 1.0 INTRODUCTION

### 1.1 Authorization

NUS Corporation performed this work under Environmental Protection Agency Contract No. 68-01-6699. This specific report was prepared in accordance with Technical Directive Document No. F3-8504-12 for the Levittown Dump located in Levittown, Pennsylvania.

### 1.2 Scope Of Work

NUS FIT III was tasked to conduct a resampling at the subject site. Prior to on-site work, the FIT was to obtain residential well and local water supply information.

### 1.3 Summary

The Levittown Dump is located near the intersection of U.S. Route 13 and Levittown Parkway in Levittown, Pennsylvania. The site area was originally operated as a quarry and was then filled with water until it was a lake. The lake was eventually emptied and used as a landfill from the early 1960s to 1974. The landfill accepted both municipal and industrial wastes. No records of hazardous waste disposal are known to exist. Past environmental sample results, collected by FIT III from the area of the site, indicate the possible presence of lead, chloroethane, di-n-butyl phthalate, and bis(2-ethylhexyl) phthalate at the site, although insufficient data exist to definitively link the contaminants with the site.

Subsequent to the past sampling activities at the site, it was learned that a number of private domestic wells were still being used. Additionally, EPA was informed of an unusually high number of cancer cases in the Tullytown population by members of F.U.S.E., a local citizens group. In light of these facts, it was decided that a resampling of the site was warranted.

Results of the sampling activities indicate the presence of low levels of chlorinated aliphatics and/or chlorobenzene in 7 of the domestic wells which were sampled. Additionally, polycyclic aromatic hydrocarbons (PAHs) and chlordane were detected in sediment samples obtained from the Levittown Lake and the Delaware (Pennsylvania) Canal.

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**SECTION 2**

## 2.0 FIELD TRIP REPORT

### 2.1 Summary

On Tuesday, April 23, 1985 and Wednesday, April 24, 1985, FIT III staff members Bruce Pluta, Michael Cramer, Judith Delconte, and Randall Dickinson conducted a resampling of the Levittown dump. FIT III was assisted by Harold Byer and Douglass Hill, of EPA Region III.

### 2.2 Persons Contacted

#### 2.2.1 Prior to Field Trip

Douglass Hill  
U.S. EPA  
841 Chestnut Building  
Ninth and Chestnut Streets  
Philadelphia, PA 19107  
(215) 597-8541

William Willsey  
Director-Environmental Affairs  
Philadelphia Electric Company  
2301 Market Street, 59/2  
P.O. Box 8699  
Philadelphia, PA 19101  
(215) 841-5030

Stanley Paulokich  
Pennsylvania Fish Commission  
Lititz, PA 17543  
(717) 626-0228

Barbara Eklof  
Manager  
Levittown Discount World  
Route 13 and Levittown Parkway  
Levittown, PA 19055  
(215) 946-1150

Waterways Patrolman  
Pennsylvania Fish Commission  
New Hope, PA 18938  
(215) 862-5301

Douglas Hoehn  
Park Superintendent  
Roosevelt State Park  
Upper Black Eddy, PA 18972  
(215) 982-5560

Father Dunlevy  
Saint Michael the Archangel  
Roman Catholic Church  
Levittown Parkway  
Levittown, PA 19055  
(215) 945-1166

#### **2.4 Site Observations**

- o The fence surrounding the site had been breached in many places. No fence was present along the northern boundary of the site.
- o Overall, the site is well vegetated with grasses and trees (primarily sumac). The northern and eastern areas of the fill were the most heavily vegetated.
- o Surface debris was noted in numerous locations. In addition to household refuse, rolls of paper (each measuring approximately 4 by 2.5 feet) were exposed at the surface of the fill. The latter observation indicates the settling and compaction of the cover material.
- o In a small section of the western portion of the fill, measuring a maximum of 50 by 50 feet, evidence of a relatively recent debris and brush fire was observed.
- o No evidence of leachate was observed at any location at the landfill.
- o The only area of stained soil appeared to be attributable to spilled motor oil.

UI: none detected; estimated  
 detection limit

Compounds Detected

Sample Number	Sample Description and Location	Phase	Units	Methylene Chloride	Acetone	4-Methylphenol	Acenaphthylene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)Anthracene	bis(2-Ethylhexyl) Phthalate	Chrysene	Benzo (b+k) Fluoranthene	Benzo (a) Pyrene	Remarks
CA104	NE Lake Surf	AQ	ug/L														
CA105	NE Lake Mid	AQ	ug/L														
CA106	NE Lake Bot	AQ	ug/L														
CA107	NE Lake	SO	ug/kg	70 UI	190 UI		150J F	270		460	520	160 UI	290	600	340		
CA108	SE Lake Surf	AQ	ug/L														
CA109	SE Lake Mid	AQ	ug/L														
CA110	SE Lake Bot	AQ	ug/L														
CA176	SE Lake	SO	ug/kg	72 UI	140 UI					76J	68J	47 UI					
CA177	SW Lake Bot	AQ	ug/L														
CA178	SW Lake	SO	ug/kg	64 UI	150 UI					110J	130J	43 UI					
CA179	Fak Lake	AQ	ug/L														
CA180	Fak Lake sed.	SO	ug/kg	85 UI	156 UI		480 F	470	200	720	1200	350 F	340	630	680	420	
CA181	Canal upstream	AQ	ug/L														
CA182	Canal downstream	SO	ug/kg	81 UI		580 F				150J	120J	39 UI					

II

NOTE: For a review of this data and non-target, tentatively identified compounds, please see the Analytical Quality Assurance section of this report.

◇ Denotes results of questionable qualitative significance based upon quality assurance review of data.

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- J - Approximate value: Detected below quantitation limit. II - Indistinguishable Isomers

F - Denotes quantitative approximation based upon Quality Assurance review.

Solid sample results reported as wet weight

Sum 3-04-  
EPA Number PA-282

Sample Data Summary  
Target Compounds

☒ Organic ☐ Inorganic

Site Name Levittown Dump  
Date of Sample 4/24/85

UJ: None detected: estimated detection limit.

Compounds Detected

II

Sample Number	Sample Description and Location	Phase	Units	Methylene Chloride	Acetone	4-Methylphenol	Acenaphthylene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)Anthracene	bis(2-Ethylhexyl) Phthalate	Chrysene	Benzo(b)k	Fluoranthene	Benzo(a) Pyrene	Remarks
CA183	Canal downstream	AQ	ug/L															
CA184	Canal upstream	SO	ug/kg	110 UJ					63J	83J		25J						
CA185	Blank	AQ	ug/L															

NOTE: For a review of this data and non-target, tentatively identified compounds, please see the Analytical Quality Assurance section of this report.

◇ Denotes results of questionable qualitative significance based upon quality assurance review of data.

Solid sample results reported as wet weight. J - Approximate value: Detected below quantitation limit. II - Indistinguishable Isomers

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Unit F<sub>2</sub> -504  
 EPA Number PA-382

SAMPLE DATA SUMMARY  
 ..RC CMP

☒ Organic ☐ Inorganic

Site Name Levittown Dump  
 Date of Sample 4/24/85

Compounds Detected

Sample Number	Sample Description and Location	Phase	Units	Indeno(1,2,3-cd) Pyrene	Benzo(g,h,i) Perylene	4,4'-DDT	4,4'-DDD	4,4'-DDE	Chlordane								Remarks
CA104	NE Lake Surf	AQ	ug/l														
CA105	NE Lake Mid	AQ	ug/l														
CA106	NE Lake Bot	AQ	ug/l														
CA107	NE Lake	SO	ug/kg	180 <sub>J</sub>	320	91 <sub>N</sub>	28 <sub>N</sub>	13 <sub>N</sub>	58								
CA108	SE Lake Surf	AQ	ug/l														
CA109	SE Lake Mid	AQ	ug/l														
CA110	SE Lake Bot	AQ	ug/l														
CA116	SE Lake	SO	ug/kg														
CA117	SW Lake Bot	AQ	ug/l														
CA179	SW Lake	SO	ug/kg				8.3 <sub>N</sub>	6.8 <sub>N</sub>									
CA179	Fax Lake	AQ	ug/l														
CA180	Fax Lake sed.	SO	ug/kg	290	570		36 <sub>N</sub>	21 <sub>N</sub>	65								
CA181	Canal upstream	AQ	ug/l														
CA182	Canal downstream	SO	ug/kg														

NOTE: For a review of this data and non-target, tentatively identified compounds, please see the Analytical Quality Assurance section of this report.

◇ Denotes results of questionable qualitative significance based upon quality assurance review of data.

- J-Approximate value: Detected below quantitation limit.

N-Evidence for presence of material is presumptive

Solid sample results reported as wet weight.

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# SAMPLE DATA SUMMARY

in GE. mPOI

Site Name Levittown Dump

Date of Sample 4/24/85

☒ Organic

☐ Inorganic

## Compounds Detected

Sample Number	Sample Description and Location	Phase	Units	Indeno(1,2,3-cd) Pyrene	Benzo(g,h,i) Perylene	4,4'-DDT	4,4'-DDD	4,4'-DDE	Chlordane									Remarks
CA183	Canal downstream	AQ	ug/l															
CA184	Canal upstream	SO	ug/kg															
CA185	Blank	AQ	ug/l															

NOTE: For a review of this data and non-target, tentatively identified compounds, please see the Analytical Quality Assurance section of this report.

◇ Denotes results of questionable qualitative significance based upon quality assurance review of data.

- Solid sample results reported as wet weight

J-Approximate value: Detected below quantitation limit.

N-Evidence for presence of material is presumptive.

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TDD Number 8504-12  
 EPA Number Case # 4248 PA 282

**SAMPLE DATA SUMMARY  
 TARGET COMPOUNDS**

☐ Organic ☒ Inorganic

Site Name Levittown Dump  
 Date of Sample 4-24-95

Sample Number	Sample Description and Location	Phase	Units	Compounds Detected												Remarks
				ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM	COBALT	COPPER	IRON	LEAD	
MCB334	NE Lake surf	AQ	ug/l	87.		28.	1.3		13000.	4.7		15.4U	96.4U		5500.	
MCB 335	NE Lake mid	AQ	ug/l	82.		28.	1.3		13200.			17.4U	100.4U		5570.	
MCB 336	NE Lake bot	AQ	ug/l	81.		28.			12700.			15.4U	114.4U		5480.	
MCB 338	SE Lake surf	AQ	ug/l	95.		27.	1.5		12500.			14.4U	105.4U		5300.	
MCB 339	SE Lake mid	AQ	ug/l	108.		28.	1.8		12600.			16.4U	137.	11.	5350.	
MCB 340	SE Lake bot	AQ	ug/l	71.		28.	1.8		13100.			13.4U	108.4U		5550.	
MCB 342	SW Lake bot	AQ	ug/l	80.		27.			12700.			12.4U	105.4U		5370.	duplicate of MCB340
MCB 344	FAR Lake	AQ	ug/l	97.		27.	1.5		13300.			15.4U	123.4U		5640.	
MCB 346	Canal upstream	AQ	ug/l	482.		24.	1.8		15700.			12.4U	646.	6.5	5840.	
MCB 348	Canal downstream	AQ	ug/l	326.		20.	1.5		13300.			8.6.4U	618.	10.	4970.	
MCB 350	Blank	AQ	ug/l	31.			1.3		16.			8.4	27.		24.	
MCB 337	NE Lake	sol.	mg/kg	19900.	39.	15.	123.		1550.	33.	22.	39.	27600.	246.	4320.	
MCB 341	SE Lake	sol.	mg/kg	18300.	34.		116.		1220.	27.	17.	39.	23600.	300.	4160.	
MCB 343	SW Lake	sol.	mg/kg	20600.	49		144.		1650.	39.	23.	51.	29100.	410.	5130.	duplicate of MCB341

NOTE: For a review of this data and non-target, tentatively identified compounds, please see the Analytical Quality Assurance section of this report.

◇ Denotes results of questionable qualitative significance based upon quality assurance review of data.

TDD Number 8501-12  
 EPA Number CASE # 4248 PA 282

**SAMPLE DATA SUMMARY  
 TARGET COMPOUNDS**

☐ Organic ☒ Inorganic

Site Name Levi Howe Dumps  
 Date of Sample 4-24-85

**Compounds Detected**

Sample Number	Sample Description and Location	Phase	Units	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM	THALLIUM	TIN	VANADIUM	ZINC	CYANIDE	% SOLIDS	Remarks
MCB 334	NE Lake Surf	AQ	ug/l	20.		1800.			10200.				55.45				
MCB 335	NE Lake Mid	AQ	ug/l	21.		1680.			10200				55.45				
MCB 336	NE Lake bot	AQ	ug/l	27.		1600.			9980.				55.45				
MCB 338	SE Lake Surf	AQ	ug/l	20.		1970.			9760.			3.8	55.45				
MCB 339	SE Lake Mid	AQ	ug/l	19.		1190.			9730.				55.45				
MCB 340	SE Lake bot	AQ	ug/l	21.		1760.			10100.				55.45				
MCB 342	SW Lake bot	AQ	ug/l	20.		1510.			9730.				55.45				
MCB 344	FAR Lake	AQ	ug/l	22.		1780.			10200.				55.45				
MCB 346	Canal upstream	AQ	ug/l	57.		894.			7990.			4.4	55.45				
MCB 348	Canal downstream	AQ	ug/l	54.		724.			6690.			4.2	55.45				
MCB 350	Blank	AQ	ug/l						39.				11.				
MCB 337	NE Lake	sol	mg/kg	264.		30.			133.		25.R	54.	308.		37.4		
MCB 341	SE Lake	sol.	mg/kg	224.		32.	1170.		193.			47.	345.		37.0		
MCB 343	SW Lake	sol.	mg/kg	266.		36.	1170.		203.		25.R	54.	438.		27.2		

NOTE: For a review of this data and non-target, tentatively identified compounds, please see the Analytical Quality Assurance section of this report.

◇ Denotes results of questionable qualitative significance based upon quality assurance review of data.

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TDD Number 8504-12  
 EPA Number Case # 4248 PA 282

**SAMPLE DATA SUMMARY  
 TARGET COMPOUNDS**

☐ Organic ☒ Inorganic

Site Name Levitown Dump  
 Date of Sample 4-24-85

**Compounds Detected**

Sample Number	Sample Description and Location	Phase	Units	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM	COBALT	COPPER	IRON	LEAD	MAGNESIUM	Remarks
MCB 345	FAR Lake sed	sol.	mg/kg	17400.		130			1370.	44.	25.	42.	25200	470.	4340.		
MCB 347	Canal downstream sed	sol.	mg/kg	7220.	22	56.	1.1		978.	12.	7.7	18.	11700.	38.	2270.		
MCB 349	Canal upstream sed	sol.	mg/kg	5460.	29.	40.			2320.	12.	3.3	16.	10400.	8.0	2280.		

NOTE: For a review of this data and non-target, tentatively identified compounds, please see the Analytical Quality Assurance section of this report.

◇ Denotes results of questionable qualitative significance based upon quality assurance review of data.

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TDD Number 8504-12  
 EPA Number Case # 4243 PA-282

**SAMPLE DATA SUMMARY  
 TARGET COMPOUNDS**

☐ Organic ☒ Inorganic

Site Name Levittown Pump  
 Date of Sample 4-24-85

				Compounds Detected													
Sample Number	Sample Description and Location	Phase	Units	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM	THALLIUM	TIN	VANADIUM	ZINC	CYANIDE	% SOLIDS	Remarks
MCB 345	FAR Lake sed	sol.	mg/kg	273.		39.	885.			138.		20. R	53.	526.		36.0	
MCB 347	Canal bottom sed.	sol.	mg/kg	122.		22.				86.			18.	98.		58.1	
MCB 349	Canal bottom sed	sol.	mg/kg	208.		9.7				104.			14.	171.		63.9	

NOTE: For a review of this data and non-target, tentatively identified compounds, please see the Analytical Quality Assurance section of this report.

◇ Denotes results of questionable qualitative significance based upon quality assurance review of data.

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### 3.2 Quality Assurance Review

#### 3.2.1 Organic Data: Lab Case 4248

##### 3.2.1.1 Introduction

The organic analysis for this case was performed by 3 CLP laboratories. The findings offered in this report are based upon a detailed review of all available data, blank analysis results, surrogate and matrix spike recoveries, laboratory duplicate results, calibration data, evaluation of confirmations, target compound matching quality, and tentatively identified compounds.

##### 3.2.1.2 Qualifiers

It is recommended that this data package be utilized only with the following qualifier statements.

- o The following results are qualitatively questionable:

<u>Compound</u>	<u>Samples with Questionable Results</u>
methylene chloride	All positive sample results
acetone	All positive sample results
2-butanone	All positive sample results
2-hexanone	CA190
bis(2-ethylhexyl) phthalate	All positive sample results, except CA180
4,4'-DDT	CA107
4,4'-DDD	All positive sample results
4,4'-DDE	All positive sample results

The aforementioned sample results were designated questionable because there is evidence to doubt the presence of these compounds at concentrations less than or similar to the levels reported. However, with certain exceptions noted below, it can be assumed that concentrations substantially greater than the levels reported cannot be present.

- o Although qualitatively confident, the following quantitative results represent approximate concentrations.

<u>Compound</u>	<u>Applicable Samples</u>
chloroethane	CA190, CA195, and CA197
1,1-dichloroethane	CA201
4-methylphenol	CA182
acenaphthylene	CA107 and CA180
benzo(a)anthracene	CA180

- o The reported detection limits for 2-chloroethyl vinyl ether in samples CA188, CA189, CA190, CA191, CA192, CA193, CA194, CA195, CA196, CA197, CA198, CA199, CA200, and CA201 are unreliable and may be substantially higher than reported.
- o The reported detection limits for benzo(ghi)perylene in samples CA104, CA105, CA106, CA108, CA109, CA110, CA177, CA179, and CA181 are unreliable and may be substantially higher than reported.
- o The reported detection limits for benzidine in samples CA107, CA176, CA178, CA180, CA182, CA104, CA105, CA106, CA108, CA109, CA110, CA177, CA179, CA181, CA183, and CA185 are unreliable and may be substantially higher than reported.
- o The actual detection limit for some acid compounds may be slightly higher than reported for samples CA189, CA191, CA194, CA196, CA198, CA199, and CA200.

- o The actual detection limit for some acid compounds may be substantially higher than reported for samples CA192, CA195, and CA201.
- o The actual detection limit for di-n-butyl phthalate may be slightly higher than reported in sample CA183.
- o The actual detection limit for aldrin may be substantially higher than reported in sample CA104.
- o The actual detection limits for CA188 may be slightly higher than reported for 4-nitrophenol and phenol and may be substantially higher than reported for pentachlorophenol.
- o Tentatively identified compounds of confident matching quality, which are not suspected artifacts, are listed on the appropriate page in the support documentation appendix to this report.

#### 3.2.1.3 Findings

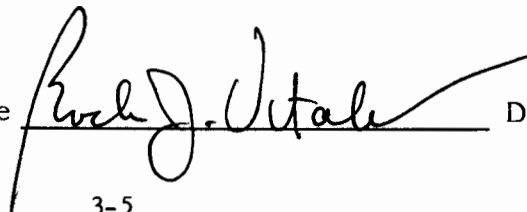
- o Field and/or laboratory blank revealed the presence of methylene chloride, acetone, 2-butanone, 2-hexanone, and bis(2-ethylhexyl) phthalate at sufficient levels to question the aforementioned sample results for these compounds.
- o Results for 4,4'-DDT and related compounds were questioned since the method of identification relies in a single peak response on dual GC columns. Results may be artifacts of chromatographic interferences.
- o The aforementioned sample results for chloroethane, 1,1-dichloroethane, 4-methylphenol, acenaphthylene, and benzo(a)anthracene should be considered estimates because the associated continuing calibration standard revealed a response factor with a high percent difference compared to the initial calibration standard.

- o Extremely low response factors were noted for 2-chloroethyl vinyl ether, benzo(ghi)perylene, and benzidine in the calibration standards associated with the aforementioned samples. As a result, the detection limits for these compounds are unreliable for the aforementioned samples.
- o Low recovery was reported for the acid surrogate compound D<sub>5</sub> phenol in samples CA189, CA191, CA194, CA196, CA198, CA199, and CA200.
- o Zero recoveries were reported for all 3 acid surrogate compounds in samples CA192, CA195, and CA201.
- o Low recovery was reported for the matrix spike compound di-n-butyl phthalate in sample CA183.
- o Zero recovery was reported for the matrix spike compound aldrin in sample CA104.
- o Low recoveries were reported for the matrix spike compounds 4-nitrophenol, phenol, and pentachlorophenol in sample CA188.
- o It is particularly noteworthy that a herbicide tradename, Norea<sup>R</sup>, was confidently identified in samples CA188 and CA195. A more detailed description of this compound can be found on the appropriate page in the Support Documentation appendix to this report.

#### 3.2.1.4 Summary

The attached Quality Assurance Review has identified the aforementioned areas of concern. The text of this report has been formatted to address only those problem areas which affect the application of the data to the subject investigation. Documentation of these problems and also documentation of any observed areas of contractual noncompliance are included in the attached Support Documentation appendix to this report.

Report prepared by Rock J. Vitale



Date: August 9, 1985

### 3.2.2 Inorganic Data: Lab Case 4248/1644C

#### 3.2.2.1 Introduction

The findings offered in this report are based upon a general review of all available inorganic laboratory data. Blank analysis results, matrix spike results, field and laboratory duplicate analysis results, quantitative calculations, and quality assurance documentation were examined in detail. In particular, several other samples (MCB334 through MCB350) are addressed in a separate report from Region III CRL.

#### 3.2.2.2 Qualifiers

It is recommended that this data package be utilized only with the following qualifier statements:

- o The following results are deemed questionable:

<u>Compound</u>	<u>Samples with Questionable Results</u>
aluminum	MCB362
cobalt	MCB359 and MCB364
iron	MCB361 and MCB364
mercury	MCB364
potassium	All positive sample results, except MCB352, MCB359, MCB361, MCB364, and MCB365

The aforementioned results were designated questionable because there is evidence to doubt the presence of these constituents at concentrations less than or similar to the levels reported. However, with the exceptions noted below, it can be assumed that concentrations substantially greater than the levels reported cannot be present.

- o The actual detection limit for silver in all samples may be higher than reported.

- o The actual detection limit for tin in sample MCB353 may be higher than reported.

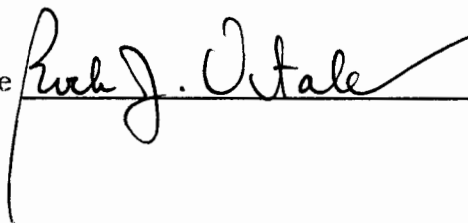
#### 3.2.2.3 Findings

- o Field and/or laboratory blank analysis revealed the presence of aluminum, cobalt, iron, mercury, and potassium at sufficient levels to question the aforementioned sample results for these constituents.
- o The laboratory control standard associated with all samples revealed low recovery for silver.
- o Low recovery was reported for the matrix spike constituent tin in sample MCB353.

#### 3.2.2.4 Summary

The text on this report has been formatted to address only those problem areas which affect the application of the data to the subject investigation. These problem areas have been identified as blank contamination and poor matrix spike and laboratory control standards recoveries as the primary areas of concern. Documentation of these problems and also documentation of any observed areas of contractual noncompliance are included in the attached Support Documentation appendix to this report.

Report prepared by Rock J. Vitale



Date: August 13, 1985

Site Name: Levittown Dump  
TDD No.: 8504-12

### 3.2.2 Inorganic Data Lab Case 4248

#### 3.2.2.1 Introduction

The findings offered in this report are based upon a review of all available sample data, blank results, matrix spike and duplicate analysis results, ICP interference QC, calibration data, and quality assurance documentation.

#### 3.2.2.2 Qualifiers

It is recommended that this data package be utilized only with the following qualifier statements:

- ° The results which may be qualitatively questionable are listed below:

<u>Constituent</u>	<u>Samples With Questionable Results</u>
Copper	MCB334, MCB335, MCB336, MCB338, MCB339, MCB340, MCB342, MCB344, MCB346, MCB348
Iron	MCB334, MCB335, MCB336, MCB338, MCB340, MCB342, MCB344
Zinc	MCB334, MCB335, MCB336, MCB338, MCB339, MCB340, MCB342, MCB344, MCB346, MCB348

- ° The aforementioned results were designated questionable since there is evidence to doubt the presence of these constituents at any concentration less than or equal to the levels reported. However, it can be assumed that concentrations significantly greater than the levels reported for these samples cannot be present.
- ° Detection limits for silver in the aqueous matrix may be elevated by 40-60%.
- ° Actual detection limits for antimony in the water matrix and tin in the solid matrix may be significantly higher than reported. Reported results for tin in the solid matrix could be biased significantly low.

#### 3.2.2.3 Findings

- ° Field blank analysis revealed the presence of copper, iron, and zinc at levels sufficient to question the aforementioned results for these parameters.

Site Name: Levittown Dump  
TDD No.: 8504-12

- ° Low matrix spike recovery was reported for silver (51%) in the aqueous matrix.
- ° Extremely low matrix spike recovery was reported for antimony (0%) in the water matrix and for tin (9%) in the solid matrix.

#### 3.2.2.4 Summary

This Quality Assurance Review has identified the following areas of concern; field blank contamination and poor matrix spike recovery.

Please see the accompanying support documentation appendix for specifics on this Quality Assurance Review.

Report prepared by Steve L. Markham:  
(301)224-2740, FTS 922-3752

Steve L. Markham Date: 7-17-85

**ORIGINAL**  
**(Red)**

**SECTION 4**

#### 4.0 TOXICOLOGICAL EVALUATION

##### 4.1 Summary

Low levels (up to 25 ug/l) of several chlorinated aliphatics (chloroethane, 1,1-dichloroethane, 1,1,1-trichloroethane, trichloroethene, tetrachloroethene, and chloroform), some of which have evidence of animal carcinogenicity, and/or chlorobenzene were reported in samples from 7 local domestic wells. The lifetime daily ingestion of 2 liters of the local groundwater could potentially pose a cancer risk of up to 1.7 in 100,000. With the possible exception of the concentration of manganese reported in the [REDACTED] (19,600 ug/l), there were no heavy metals reported at levels of concern to human health in home well samples. The [REDACTED] [REDACTED] not currently used as a potable water source. Levels of iron (388 to 2,110 ug/l) and manganese (52 to 19,600 ug/l) reported in some home well samples could, however, adversely affect the taste and odor of the water. The levels of sodium measured in several home wells (17,000 to 105,000 ug/l) could be of potential concern to individuals on sodium-restricted diets.

PAHs (up to 6,550 ug/kg total) and chlordane (up to 65 ug/kg) were reported in sediment samples from the site-adjacent canal and lake, both of which are used for recreational fishing. Chlordane and some PAHs have evidence of animal carcinogenicity. Chlordane strongly bioaccumulates in aquatic food chains. The analysis of resident fish tissue would be necessary to determine whether there are levels of chlordane, and possibly PAHs, that might pose a health risk to fish consumers.

There was insufficient information available to determine whether the groundwater and surface water contamination might be site related.

#### 4.2.2.1 Organics

PAHs were identified in sediment samples from the lake (up to 6,550 ug/kg total) and the upstream (146 ug/kg) and downstream (270 ug/kg) sampling locations from the canal. Chlordane (up to 65 ug/kg) was identified in sediment samples from the lake. 4-Methylphenol (approximately 580 ug/kg) was measured in the downstream sediment sample from the canal. There were no organic priority pollutants reported within quantifiable limits in aqueous samples from the lake or canal.

Chlordane is highly persistent in the environment and strongly bioaccumulates in aquatic food chains. BCFs on the order of 1,000 to 10,000 have been reported for aquatic organisms, including species of fish.<sup>10</sup> Although chlordane was not reported at or above the minimum quantifiable limit of 0.5 ug/l in aqueous samples, it is possible that it might have been present at lower concentrations. For the sake of perspective, a rough estimate of the concentration of chlordane in the lake can be calculated by dividing the sediment level by the soil adsorption coefficient (30,000). The estimated value, 0.0017, is only slightly less than a Freshwater Final Residue Value of 0.0043 ug/l which has been derived to prevent chlordane from accumulating in the tissues of edible fish at levels exceeding the action level (0.3 mg/kg) established by the U.S. Food and Drug Administration for the marketability of fish.<sup>11</sup> It can be calculated that the lifetime ingestion of 6.5 g of seafood per day from water containing 0.0017 ug/l of chlordane could pose a carcinogenic risk of 3.5 in 1,000,000.<sup>11</sup> The estimated value is notably below a Final Chronic Value of 0.17 ug/l, which has been determined for the protection of freshwater aquatic life.<sup>11</sup>

In general, PAHs are not highly persistent in surface waters. In the aqueous phase, they are degraded by photolysis and, to a lesser extent, by oxidation. Those in the sediment can undergo biodegradation and biotransformation by benthic organisms.<sup>6</sup> However, if incorporated into sediments below the aerobic surface layer where biodegradation is slow, PAHs may remain for long periods of time.<sup>7</sup> PAHs can enter food chains from sediments via sorption by plants and by ingestion by bottom-feeding organisms. Although bioconcentration factors (BCFs) of up to approximately 134,000 have been reported for invertebrates, BCFs for vertebrates tend to be lower; a value of 30 is considered typical of fish.<sup>8</sup> PAHs tend to be rapidly metabolized and excreted, and there is no evidence for their long-term bioaccumulation. However, the regular ingestion of fish from PAH-contaminated water might be a potential source of some concern to consumers. A number of PAHs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene, which were identified in sediment samples from the lake, have evidence of animal carcinogenicity.<sup>9</sup> Pyrene and benzo(g,h,i)perylene, identified in canal and/or lake sediment samples, have evidence of cocarcinogenicity in animals.<sup>8</sup> Although PAHs were not reported at or above contract required minimum quantifiable limits (20 to 40 ug/l) in aqueous samples, it is possible that concentrations below these limits may be present. Based on rough calculations similar to that described for chlordane, the PAH concentration in the lake would be expected to be less than 0.5 ug/l. It can be calculated that the lifetime ingestion of 6.5 g of seafood per day from water containing 0.5 ug/l PAHs (total) could pose a carcinogenic risk of approximately 1.6 in 100,000.<sup>8</sup>

The possibility that PAHs and/or chlordane may be present in the tissues of fish, particularly those in the lake, at concentrations that may be of potential concern to regular consumers of resident fish cannot be ruled out. The analysis of fish tissue would be necessary to further assess this possibility.

Neither PAHs nor chlordane would be expected to infiltrate the groundwater. Their water solubilities are low and/or they tend to sorb to organic materials in sediments.

4-Methylphenol, measured at 580 ug/kg in the downstream sediment sample from the canal, would not be expected to pose a hazard to aquatic life or its consumers. It is biodegradable, and would not be expected to persist in surface waters or bioaccumulate.<sup>6</sup> It is, however, slightly soluble in water and might potentially infiltrate the groundwater. With the exception of 4-methylphenol, which was detected only in the downstream sediment sample of the canal, the levels of priority pollutants measured in up- and downstream canal samples were similar.

#### 4.2.2.2 Inorganics

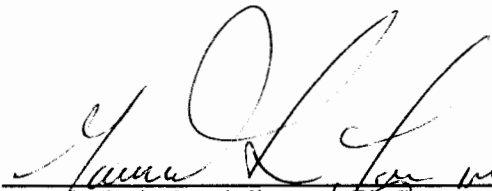
There were no inorganics reported at unusual levels in aqueous samples from the lake or canal. However, a few metals (lead, aluminum, and possibly copper and zinc) were reported in aqueous samples at concentrations that might be injurious to sensitive aquatic species. The Ambient Water Quality Criterion (AWQC) (4-day average) for lead for the protection of freshwater aquatic life varies with water hardness. It is 1.3, 3.2, and 7.7 ug/l at water hardnesses of 50, 100, and 200 mg/l as  $\text{CaCO}_3$ , respectively.<sup>12</sup> Lead was reported at levels of 6.5 to 11 ug/l. Elevated levels of lead (246 to 470 mg/kg) were measured in sediment samples from the lake and canal. A level of 20 mg/kg has been reported as a typical average for sediments.<sup>13</sup>

Although there is no AWQC for aluminum, a concentration of 100 ug/l has been reported to be lethal to a fish species (stickleback) after 1 week of exposure.<sup>14</sup> Although copper (up to approximately 16 ug/l) and zinc (approximately 55 ug/l) could not be confidently identified in aqueous samples due to blank contamination, if present at the reported concentrations, they could potentially be injurious to some sensitive aquatic species. The AWQC for zinc is 47 ug/l, for copper it is 6.5, 12, and 21 ug/l at water hardnesses of 50, 100, and 200 mg/l as  $\text{CaCO}_3$ , respectively.<sup>12, 15</sup>

Antimony was measured in sediment samples from the lake and canal at concentrations (22 to 49 mg/kg) higher than a typical range (0.05 to 1.5 mg/kg) reported for sediments.<sup>16</sup>

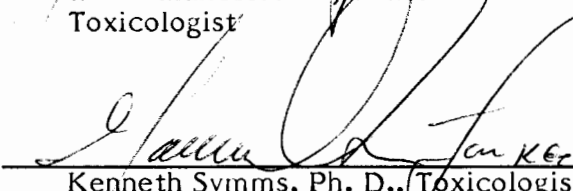
At the measured levels, the inorganics reported in surface water samples would not be expected to pose any health hazards to fish consumers.

Prepared by:

  
Isabel Mandelbaum, Ph.D.  
Toxicologist

Date: September 13, 1985

Reviewed by:

  
Kenneth Symms, Ph. D., Toxicologist

Date: September 13, 1985

LIST OF SOURCES

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6. U.S. Environmental Protection Agency. 1979. Water-Related Fate of 129 Priority Pollutants. Vol. II. No. PB80-204381.
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10. U.S. Environmental Protection Agency. 1979. Water-Related Fate of 129 Priority Pollutants. Vol. I. PB80-204373.

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12. Federal Register. July 29, 1985. Water Quality Criteria; Availability of Documents. 50(145):30784.
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14. Murdock, H.R. 1953. Industrial Wastes. Some data on toxicity of metals in wastes to fish life are presented. Ind. Eng. Chem. 45:99A.
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ORIGINAL  
(Red)

APPENDIX A

C

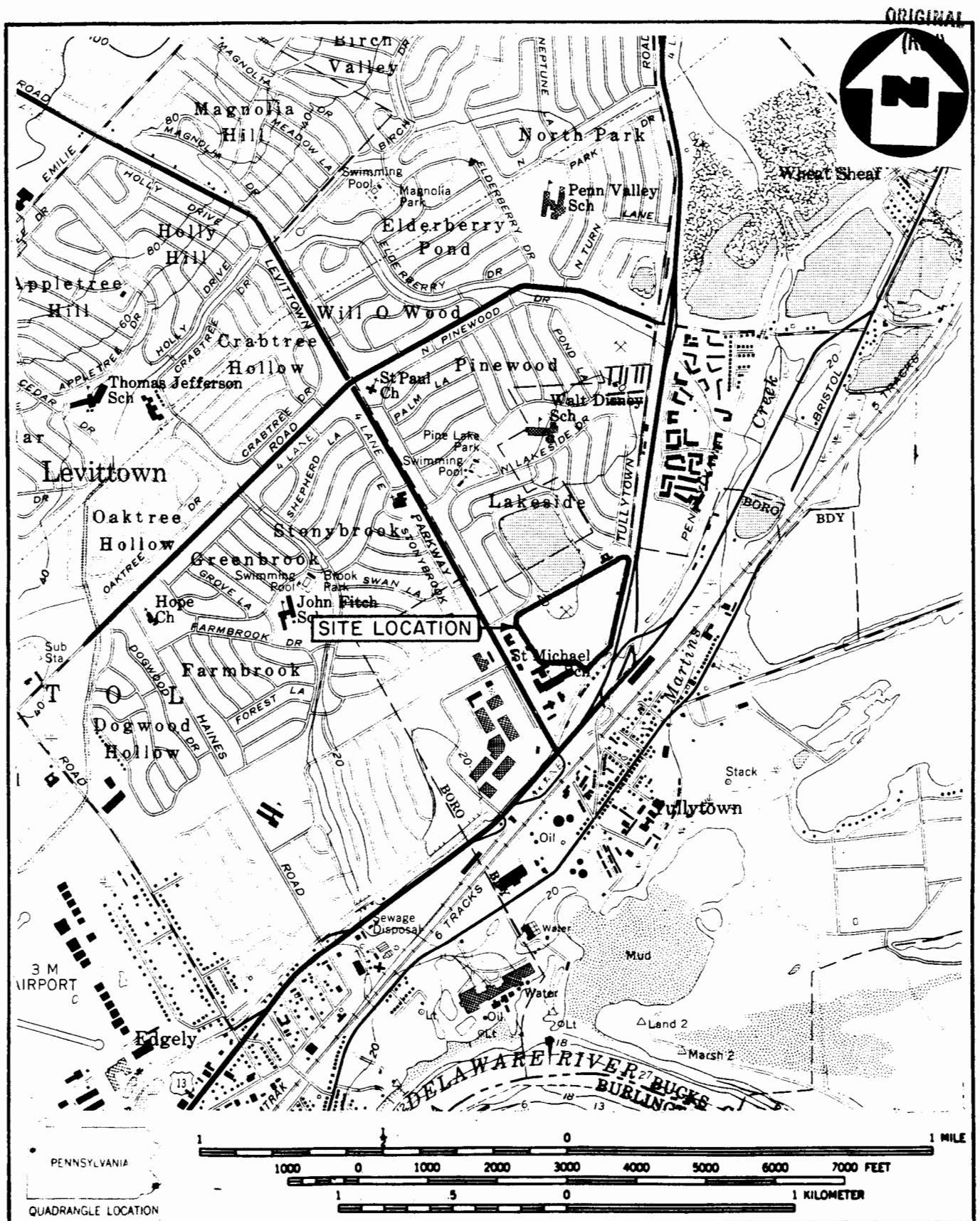
C

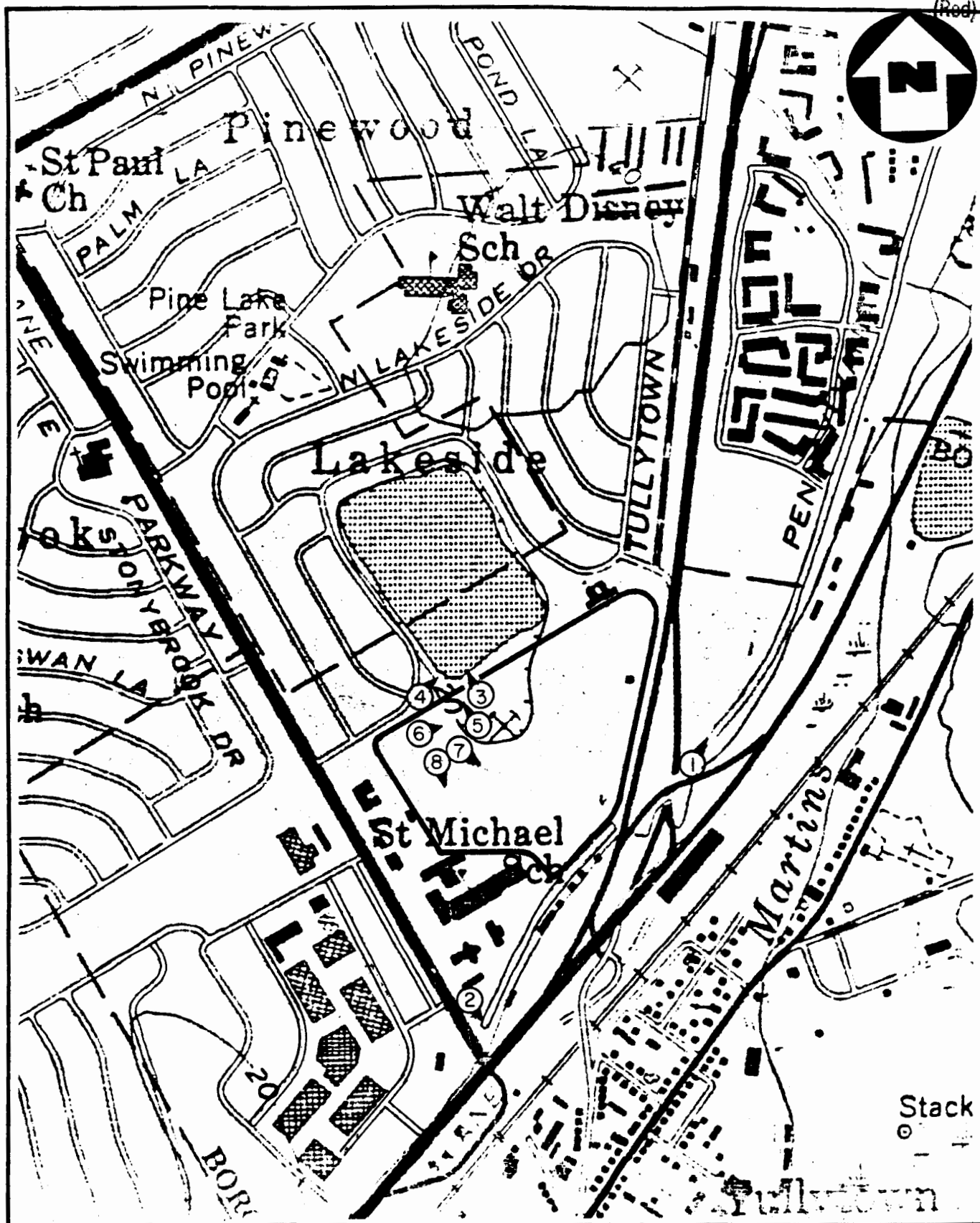
1. POST CENTER:		REM/FIT ZONE CONTRACT TECHNICAL DIRECTIVE DOCUMENT (TDD)			2. NO. :  F3-8504-12	
3. ACCOUNT NO.:		4. ESTIMATE OF TECHNICAL HOURS:  180		5. EPA SITE ID:  PA-282	6. COMPLETION DATE:  3 wks. after QA	7. REFERENCE INFO.:
<input checked="" type="checkbox"/> HIGH <input type="checkbox"/> MEDIUM <input type="checkbox"/> LOW		4A. ESTIMATE OF SUBCONTRACT COST:		5A. EPA SITE NAME: <u>Levittown Dump</u> <u>Levittown, PA</u>	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> ATTACHED <input type="checkbox"/> PICK UP Contact: Doug Hill	
8. GENERAL TASK DESCRIPTION: <u>Perform resampling at the subject site.</u>						
9. SPECIFIC ELEMENTS: <ol style="list-style-type: none"> <li>1.) <u>Review background information.</u></li> <li>2.) <u>Obtain residential well information &amp; local water supplier information.</u></li> <li>3.) <u>Prepare and submit sampling plan to EPA for approval.</u></li> <li>4.) <u>Coordinate lab analysis, EPA will arrange for 15 day turnaround of the residential well samples</u></li> <li>5.) <u>Coordinate all access requirements.</u></li> <li>6.) <u>Conduct on and off site inspections and sampling.</u></li> <li>7.) <u>Take and ship samples according to standard protocol.</u></li> <li>8.) <u>Scan analytical results immediately upon receipt for health risk concerns, and inform EPA.</u></li> </ol>						10. INTERIM DEADLINES: <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
11. DESIRED REPORT FORM: FORMAL REPORT <input type="checkbox"/> LETTER REPORT <input checked="" type="checkbox"/> FORMAL BRIEFING <input type="checkbox"/> 10.) <u>All work on this project to be performed according to: WP-Sr-1, Rev.1.</u>						
OTHER (SPECIFY): <u>Flat bottom boat will be required for obtaining samples of Levittown Lake, sent if needed.</u> <u>Refer to the attached request form for additional information.</u>						
12. COMMENTS: <u>Coordinate all activities with Doug Hill</u> <u>State Code 042</u> <u>County Code 017</u>						
13. AUTHORIZING (PO):  (SIGNATURE)					14. DATE:  	
15. RECEIVED BY: <input type="checkbox"/> ACCEPTED <input type="checkbox"/> ACCEPTED WITH EXCEPTIONS <input type="checkbox"/> REJECTED  (CONTRACTOR RPM SIGNATURE)					16. DATE:  	



ORIGINAL  
(Red)

APPENDIX B





SOURCE: (7.5 MINUTE SERIES) USGS TRENTON WEST, PA. QUAD.

PHOTO LOCATION MAP  
LEVITTOWN DUMP, LEVITTOWN, PA.  
(SCALE UNKNOWN)

FIGURE 4

**ORIGINAL**  
**(Red)**

APPENDIX C

PROJECT NAME: Levittown Dump  
TDD NO: F3-8504-12

EPA SITE NO.: PA-282  
REGION: FL III  
(new)

QUALITY ASSURANCE REVIEW OF  
ORGANIC ANALYSIS LAB DATA PACKAGE

Case No.: 4248  
Contract No.: 68-01-6756  
Contract Laboratory: VERSAR  
Applicable IFB No.: WA83-A064  
Reviewer: Rock J. Vitale  
Review Date: 8/9/85

Applicable Sample No's.: CA104, CA105, CA106,  
CA108, CA109, CA110, CA177, CA179,  
CA181, CA183, CA185

The organic analytical data for this case has been reviewed. The quality assurance evaluation is summarized in the following table:

Reviewer's Evaluation*	Fraction				
	VOLATILES	ACIDS	BASE/ NEUTRALS	PCB/ PEST.	TCDD
Acceptable	✓	✓		✓ #1, #5	
Acceptable with exception(s)			✓ #2, #3, #4		Not
Questionable					Analyzed
Unacceptable					

\* Definitions of the evaluation score categories are listed on next page.

This evaluation was based upon an analysis of the review items indicated below:

- DATA COMPLETENESS
- BLANK ANALYSIS RESULTS
- SURROGATE SPIKE RESULTS
- MATRIX SPIKE RESULTS
- DUPLICATE ANALYSIS RESULTS
- EVALUATION OF CONFIRMATIONS
- QUANTITATIVE CALCULATIONS
- TARGET COMPOUND MATCHING QUALITY
- TENTATIVELY IDENTIFIED COMPOUNDS
- CHROMATOGRAPHIC SENSITIVITY CHECKS
- DFTPP AND BFB SPECTRUM TUNE RESULTS
- STANDARDS
- CALIBRATION CHECK STANDARDS
- INTERNAL STANDARDS PERFORMANCE

Data review forms are attached for each of the review items indicated above.

† No errors noted, no form attached.

● Spot Check performed.

Comments: #1 Please see blank analysis - Lindane, raised D.L's by Lab.  
#2 Please see initial & continuing calibrations (benzidine & benzo(ghi)perylene)  
#3 - Failed 2 CCC compounds - no effect on data  
#4 - No Lab blank for BNA's sps run on 5/13 or 5/14 - since no  
positive results - no effect on data  
#5 Failed some pesticide Criteria (1% difference calibration factor)  
however this does no effect data.

## DATA EVALUATION SCORE CATEGORIES

ORIGINAL  
(Red)

ACCEPTABLE: Data is within established control limits, or the data which is outside established control limits does not affect the validity of the analytical results.

ACCEPTABLE WITH EXCEPTION(S): Data is not completely within established control limits. The deficiencies are identified and specific data is still valid, given certain qualifications which are listed below.

QUESTIONABLE: Data is not within established control limits. The deficiencies bring the validity of the entire data set into question. However, the data validity is neither proved nor disproved by the available information.

UNACCEPTABLE: Data is not within established control limits. The deficiencies imply the results are not meaningful.

DATA COMPLETENESS		CONC./MATRIX	ORIGINAL (Red)											
FRACTION	TRAFFIC REPORT # CA1	6/AQ	04	05	06	08	09	10	77	79	81	83	85	Rep
	LAB I.D. # 24		87G	88G	89G	90G	91G	92G	93G	94G	95G	96G	97G	
VOA :	RUN DATE/TIME	✓												✓
	TARGET COMPOUND TAB.	✓												✓
	TARGET COMPOUND D.L.	✓												✓
	TENT. I.D. COMPOUND TAB.	✓												✓
	SURROGATE RECOVERY	✓												✓
	GC SCREEN TABULATION	✓												✓
	GC/MS CHROMATOGRAMS	✓												✓
	TARGET CMPD. QUAN. LIST	✓												✓
	TARGET CMPD. SPECTRA	✓*												✓
	TENT. I.D. CMPD. Q.L.	✓												✓
	TENT. CMPD. LIB. SRCH.	✓												✓
	CHRO./SENS. CHECKS	✓												✓
	BFB/QFTPP TUNE DATA	✓												✓
	I.S. AREAS CHARTS	N/R												✓
	I.S. REL. RESP. FORM	N/R												✓
	RF & AMTS.: CALIB. CHK.	✓												✓
	RF & AMTS.: 3-PT CALIB.	✓												✓
	Chromatograms: Calib. Chk.	✓												✓
	Chromatograms: 3-Pt. Calib.	✓												✓
	LINEARITY: 3-PT. CALIB	✓												✓
	RF COMPARISON	✓												✓
	SAMPLE/FIELD BLANK												✓	
	METHOD/INSTR. BLANK													✓
	LAB DUPLICATE													
	FIELD DUP/REP													
	MAT. SPK./M. STD.													

COMMENTS: N/R - NOT REQUIRED  
 \* - NO POSITIVES REPORTED

DATA COMPLETENESS		CONC./MATRIX											ORIGINAL (Red)
FRACTION	TRAFFIC REPORT #CA!	04	05	06	08	07	10	77	79	81	83	85	Rep.
	LAB I.D. # 24	87G	88G	89G	90G	91G	92G	93G	94G	95G	96G	97G	
BNA :	RUN DATE/TIME	✓											
	TARGET COMPOUND TAB.	✓											
	TARGET COMPOUND D.L.	✓											
	TENT. I.D. COMPOUND TAB.	✓											
	SURROGATE RECOVERY	✓											
	GC SCREEN TABULATION	✓											
	GC/MS CHROMATOGRAMS	✓											
	TARGET CMPD. QUAN. LIST	✓											
	TARGET CMPD. SPECTRA	✓*											
	TENT. I.D. CMPD. Q.L.	✓											
	TENT. CMPD. LIB. SRCH.	✓											
	CHRO./SENS. CHECKS	✓											
	DFB/DFTPP TUNE DATA	✓											
	I.S. AREAS CHARTS	N/R											
	I.S. REL. RESP. FORM	N/R											
	RF & AMTS.: CALIB. CHK.	✓											
	RF & AMTS.: 3-PT CALIB.	✓											
	Chromatograms: Calib. Chk.	✓											
	Chromatograms: 3-Pt. Calib.	✓											
	LINEARITY: 3-PT. CALIB	✓											
	RF COMPARISON	✓											
	SAMPLE/FIELD BLANK												✓
	METHOD/INSTR. BLANK												✓
	LAB DUPLICATE												
	FIELD DUP/REP												
	MAT. SPK./M. STD.												
PEST. :	PESTICIDE TABULATION	✓											
	PEST. D.L. TABULATION	✓											
	PESTICIDE CHRO.	✓											
	PESTICIDE STD. CHRO.	✓											
	PESTICIDE STD. I.D.	✓											
	2nd COLUMN CONF.	N/A*											
	GC/MS CONFIRMATION	N/A*											
	PESTICIDE DUPLICATE												
	PESTICIDE SPIKE												
	PESTICIDE BLANK												✓
	STD SUMMARY	✓											
	LINEARITY CHK.	✓											
	DEGRAD. CHK.	✓											
	DBC RT SHIFT	✓											

N/A-not applicable \* No pesticides reported - N/R - Not Required.

KEY TO DATA COMPLETENESS FORM

ORIGINAL  
(Red)

Abbreviation Used on Form

Description of Checklist Item

Conc./Matrix	Concentration category submitted in analysis request (low, med, hi); and matrix (sol., aq.)
Fraction	Fill in acid, base/neutral, acid/base/neutral, or volatiles analysis
Run Date/Time	Instrument run date (to be used for correlating calibration)
Target Cmpd. Tab.	Tabulated results for target compounds
Target Cmpd. D.L.	Detection limits for target compounds (actual/level indicated by screen)
Tent. LD. Cmpd. Tab.	Tabulated results for tentatively identified compounds
Surr. Rec.	Surrogate recoveries results
GC Screen Tab.	Tabulated GC screen results indicating required level of followup
GC/MS Chromatograms	Chromatograms of GC/MS analysis runs
Target Cmpd. Quan. List	Target compounds quantitation list, showing areas, ret. times
Target Cmpd. Spectra	Enhanced and unenhanced spectra of target compound hits
Tent. LD. Cmpd. Q.L.	Quantitation list for tentatively identified compounds
Tent. Cmpd. Lib. Srch.	Spectra and library match spectra of tentatively identified compounds
Chro./Sens. Checks	EICP's and R.R.F.'s for chromatographic sensitivity checks
BFB/DFTPP Tune Data	Spectra intensity lists, and criteria comparison forms for BFB, DFTPP
I.S. Areas Charts	Internal standards area control charts and description of remedial action
I.S. Rel. Resp. Form	Internal standards relative response listings for each sample run
RF and amts.: Calib. Chk.	Tabulated response factors and amount injected for all cmpds. in calibration check
RF and amts.: 3-Pt. Calib.	Tabulated response factors and amount injected for all cmpds. in 3-point calibration
Chromatograms: Calib. Chk.	Chromatograms for calibration check standard
Chromatograms: 3-Pt. Calib.	Chromatograms for 3-point multilevel calibration standards.
Linearity: 3-Pt. Calib.	Tabulated correlation coefficient or relative standard deviation for calibration
RF Comparison	Tabulated comparison of calibration Response Factor with check standard
Sample/Field Blank	Equipment rinse or reagent water blank shipped with samples from field
Method/Instr. Blank	Method or instrument blank which is prepared at lab
Lab Duplicate	Sample which was split by lab for duplicate analysis
Field Dup/Rep	Sample which was split or collected twice in the field
Mat. Spk./M. Std.	Matrix spike or method standard (blind, or done by lab)
Pest. Tab.	Tabulated results for pesticides
Pest. D.L. Tab.	Tabulated detection limits for pesticides
Pest. Chro.	Chromatograms for pesticide screening
2 <sup>nd</sup> Col. Conf.	Confirmation of pesticide results by using a second GC column and temperature
GC/MS Conf.	Confirmation of pesticide results by GC/MS analysis
Pest. Dup., Spk. Blk.	Pesticide duplicate, spike, and blank
Pest. Std. Chro.	Chromatogram of pesticide standard
Pest. Std. LD.	Pesticide standard identification form
TCDD	2,3,7,8-tetrachlorodibenzo-dioxin
TCDD Tab., D.L., EICP, Blk.	TCDD tabulated results, detection limits, <u>extracted ion current</u> profile, blank

KEY TO SYMBOLS USED IN DATA COMPLETENESS TABLE

Symbol

Meaning

✓	Data item present
NA	Data item not applicable or not required
P	Data item within established control limits
F	Data item outside established control limits
MS	Missing item

Symbol

Meaning

I	Incomplete data item
NC	Data item not clearly explained (units of conc., etc)
* or [number]	See footnote
XX/XX/XX XX:XX	Date/Time of run (calibration, etc.)

**DISAL**

tion) L I M

COMMENTS:

- (1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

#3 Lab has raised its D/L for Undene since low level BHC peaks appear in coal spks & Wlhrs.

→ Note: No lab blank for BNA 5/14 or 5/13 - majority of  
spl's run on 5/13 - Does not affect data since no  
positives were detected.

→ VOA Lab blanks are all present - applicable to spls.

## REAGENT BLANK SUMMARY

**68-01-6756**

Case No. 4248

Contractor VERSAR, INC.

**Contract No.** \_\_\_\_\_

000008

[illegible]**Comments:**

2

Case No. 4248 Contract Laboratory Versar, Inc. Contract No. 68-01-6756

\* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

ADVISORY LIMITS ONLY

Volatiles: 0 out of 45; outside of QC limits

Semi-Volatiles: 0 out of 84; outside of QC limits

**Pesticides:** 2 out of 15; outside of QC limits

Comments: NA - not analyzed; not required

[7] Actual oil for pesticides in CA183 may be slightly higher

[2] Not Substantially out of Criteria.

# WATER MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

68-01-6756

Case No. 4248

Contractor VERSAR, INC.

Contract No. \_\_\_\_\_

000007

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS*	
									RPD	RECOVERY
VOA SMO SAMPLE NO. <u>CA 179</u>	1,1-Dichloroethene	50	0	43.	86	49.	98	13	14	61-145
	Trichloroethene	50	0	45.	90	50.	100	11	14	71-120
	Chlorobenzene	50	0	48.	96	51.	102	6	13	75-130
	Toluene	50	0	62.	124	69.	138*	11	13	76-125
	Benzene	50	0	54.	108	60.	120	11	11	76-127
B/N SMO SAMPLE NO. <u>CA 183</u>	1,2,4-Trichlorobenzene	100	0	74	74	72	72	3	28	39-98
	Acenaphthene	100	0	77	77	74	74	4	31	46-118
	2,4-Dinitrotoluene	100	0	74	74	71	71	4	38	24-96
	Di-n-Butylphthalate	100	0	13	(13)	(13)	13	0	40	11-117
	Pyrene	100	0	85	85	70	70	19	31	26-127
	N-Nitroso-Di-n-Propylamine	100	0	72	72	71	71	1	38	41-116
	1,4-Dichlorobenzene	100	0	73	73	73	73	0	28	36-97
ACID SMO SAMPLE NO. <u>CA 183</u>	Pentachlorophenol	200	0	179	90	182	91	1	50	9-103
	Phenol	200	0	150	75	151	76	1	42	12-89
	2-Chlorophenol	200	0	165	83	158	79	5	40	27-123
	4-Chloro-3-Methylphenol	200	0	168	84	166	83	1	42	23-97
	4-Nitrophenol	200	0	171	85*	170	85*	0	50	10-80
PEST SMO SAMPLE NO. <u>CA 104</u>	Lindane	0.2	0	0.48	240*	0.39	195*	21*	15	56-123
	Heptachlor	0.2	0	0.16	80	0.14	70	13	20	40-131
	Aldrin	0.2	0	0.11	55	0	0*	200*	22	40-120
	Dieldrin	0.5	0	0.34	68	0.34	68	0	18	52-128
	Endrin	0.5	0	0.35	70	0.35	70	0	21	56-121
	4,4'-DDT	0.5	0	0.37	72	0.35	70	6	27	38-127

No effect

[1]

No effect

[2]

[3]

\* ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5; outside QC limits  
 B/N 0 out of 7; outside QC limits  
 ACID 0 out of 5; outside QC limits  
 PEST 2 out of 6; outside QC limits

RECOVERY: VOAs 1 out of 10; outside QC limits  
 B/N 0 out of 17; outside QC limits  
 ACID 2 out of 10; outside QC limits  
 PEST 3 out of 12; outside QC limits

[1] Actual D.L. for Di-n-butyl phthalate in CA183 may be slightly higher

[2] Beta-BHC peak is present in everything (which has raised D.L.), but certainly a contributory effect is obvious for the high recovery

[3] Actual D.L. for Aldrin in sample CA104 may be substantially higher

## TENTATIVELY IDENTIFIED COMPOUND SAMPLE RESULTS

ALL TENTATIVE IDENTIFICATIONS OF CONFIDENT MATCHING QUALITY, WHICH AREN'T SUSPECTED ORIGINAL ARTIFACTS/CONTAMINANTS, ARE LISTED BELOW:

[illegible]

ORIGINAL

Red

SAMPLE #	FRACTION	SCAN # (S)	SPECTRUM MATCH INDICES		ESTIMATED CONCENTRATION	COMPOUND NAME	COMMENTS
			TYPE	SCORE			
Reagent Cu	VOA				N.D.		
	BNA	305			11 ug/L	(1-methylethylidene)-cyclopropane	
		473			37 ug/L	PCE	
		651			13 ug/L	1-methoxy-2-(methoxy methoxy)-	
		1793			55 ug/L	1,13-Tetradecadiene	
Reagent B4	VOA				N.D.		
CA185	VOA				N.D.		
	BNA	305			15 ug/L	cyclohexene	
		474			47 ug/L	PCE	
		652			9.1 ug/L	1-methoxy-2-(methoxy methoxy)-Cthone	
		1795			100 ug/L	1,13-tetradecadiene	

## GC/MS TUNING AND MASS CALIBRATION

Case No. 4248 Contractor Vegar, Inc. Contract No. 68-01-6756  
Instrument ID Finn 1 Date 5/13/25 Time 11:39 (Red)  
Lab ID 3397 #632 Data Release Authorized By: [Signature]

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	48.53 ✓
68	less than 2.0% of mass 69	0.85 (1.7) <sup>1</sup>
69	mass 69 relative abundance	49.27 ✓
70	less than 2.0% of mass 69	0 (0) <sup>1</sup>
127	40.0 - 60.0% of mass 198	42.34 .
197	less than 1.0% of mass 198	0.71
198	base peak, 100% relative abundance	100.00 .
199	5.0 - 9.0% of mass 198	6.88 .
275	10.0 - 30.0% of mass 198	17.20 .
365	greater than 1.00% of mass 198	1.38 .
441	present, but less than mass 443	6.72
442	greater than 40.0% of mass 198	43.17
443	17.0 - 23.0% of mass 442	8.25 (19.1) <sup>2</sup>

<sup>1</sup>Value in parenthesis is % mass 69.

<sup>2</sup>Value in parenthesis is % mass 442.

**THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING  
SAMPLES, BLANKS AND STANDARDS.**

Tune OK.

[illegible]

## Decafluorotriphenylphosphine (DFTPP)

Case No. 4248 Contractor Versar, Inc. Contract No. 68-91-6756  
Instrument ID Finn 1 Date 5/14/85 Time 9:41  
Lab ID 3411 #626 Data Release Authorized By: [Signature]

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	57.75
68	less than 2.0% of mass 69	0.84 (1.5) <sup>1</sup>
69	mass 69 relative abundance	54.98
70	less than 2.0% of mass 69	0 (0) <sup>1</sup>
127	40.0 - 60.0% of mass 198	42.18
197	less than 1.0% of mass 198	0
198	base peak, 100% relative abundance	100.00
199	5.0 - 9.0% of mass 198	6.49
275	10.0 - 30.0% of mass 198	17.78
365	greater than 1.00% of mass 198	1.46
441	present, but less than mass 443	5.81
442	greater than 40.0% of mass 198	40.18
443	17.0 - 23.0% of mass 442	7.38 (18.4) <sup>2</sup>

<sup>2</sup>Value in parenthesis is % mass 442.

**THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING  
SAMPLES, BLANKS AND STANDARDS.**

Tune OK.

[illegible]

# GC/MS TUNING AND MASS CALIBRATION

## Decafluorotriphenylphosphine (DFTPP)

Case No. 4248 Contractor Versar, Inc. Contract No. 68-01-6756  
 Instrument ID Finn 1 Date 5/10/85 Time 11:52  
 Lab ID 3386 # 622 Data Release Authorized By: [Signature]

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	50.84
68	less than 2.0% of mass 69	0.99 ✓ (1.92) <sup>1</sup>
69	mass 69 relative abundance	51.49
70	less than 2.0% of mass 69	0 (0) <sup>1</sup>
127	40.0 - 60.0% of mass 198	43.97
197	less than 1.0% of mass 198	0
198	base peak, 100% relative abundance	100.00
199	5.0 - 9.0% of mass 198	6.94
275	10.0 - 30.0% of mass 198	16.94
365	greater than 1.00% of mass 198	1.45 ✓
441	present, but less than mass 443	6.80
442	greater than 40.0% of mass 198	43.49
443	17.0 - 23.0% of mass 442	8.63 ✓ (19.8) <sup>2</sup>

<sup>1</sup>Value in parenthesis is % mass 69.

<sup>2</sup>Value in parenthesis is % mass 442.

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING  
 SAMPLES, BLANKS AND STANDARDS.

Tune OK  
- W.

SAMPLE ID	LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
STD # 3376	File 3387 BNA std. 160 ng	5/10/85	12:43
STD # 3377	File 3388 180 ng		13:51
STD # 3378	File 3389 80 ng		14:58
STD # 3379	File 3390 50 ng		16:07
STD # 3380	File 3391 20 ng		17:14
R.B	File 3392 Low Water Reagent Blank		18:21
CA483	File 3393 Low Water Sample		19:27
CA183 MS	File 3394 Matrix Spike		20:33
CA183 MSD	File 3395 Matrix Spike Dup.		21:39
CA185	File 3396 Low Water Sample		22:45
000009			

## GC/MS TUNING AND MASS CALIBRATION

### Bromofluorobenzene (BFB)

68-01-6756

Case No. 4248 Contractor VERSAR, INC. Contract No. \_\_\_\_\_  
Instrument ID HP Date 4-18-85 Time 1645  
Lab ID 29566 Data Release Authorized By: Seb

m/e	ION ABUNDANCE CRITERIA
-----	------------------------

**%RELATIVE ABUNDANCE**

50	15.0 - 40.0% of the base peak	23.8 ✓	
75	30.0 - 60.0% of the base peak	57.9	
95	Base peak, 100% relative abundance	100.0	
96	5.0 - 9.0% of the base peak	8.7	
173	Less than 1.0% of the base peak	Ø	
174	Greater than 50.0% of the base peak	89.7	
175	5.0 - 9.0% of mass 174	7.2 ✓	(8.0) <sup>1</sup>
176	Greater than 95.0%, but less than 101.0% of mass 174	88.7 ✓	(98.9) <sup>1</sup>
177	5.0 - 9.0% of mass 176	6.4 ✓	(7.2) <sup>2</sup>

<sup>1</sup> Value in parenthesis is % mass 174.<sup>2</sup> Value in parenthesis is % mass 176.

**THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING  
SAMPLES, BLANKS AND STANDARDS.**

Tune OK. R.

[illegible]

2nd

68-01-6756

m/e	ION ABUNDANCE CRITERIA
-----	------------------------

**%RELATIVE ABUNDANCE**

<sup>1</sup> Value in parenthesis is % mass 174.

<sup>2</sup>Value in parenthesis is % mass 176.

Tune fine. W.

~~000013~~  
4784

## GC/MS TUNING AND MASS CALIBRATION

## Bromofluorobenzene (BFB)

68-01-6756

Case No. 4248 Contractor VERSAR, INC. Contract No. \_\_\_\_\_  
Instrument ID HP Date 4-26-85 Time 0750  
Lab ID 29632 Data Release Authorized By: [Signature]

m/e	ION ABUNDANCE CRITERIA
43	100
55	100
67	100
79	100
91	100
103	100
115	100
127	100
139	100
151	100
163	100
175	100
187	100
199	100
211	100
223	100
235	100
247	100
259	100
271	100
283	100
295	100
307	100
319	100
331	100
343	100
355	100
367	100
379	100
391	100
403	100
415	100
427	100
439	100
451	100
463	100
475	100
487	100
499	100
511	100
523	100
535	100
547	100
559	100
571	100
583	100
595	100
607	100
619	100
631	100
643	100
655	100
667	100
679	100
691	100
703	100
715	100
727	100
739	100
751	100
763	100
775	100
787	100
799	100
811	100
823	100
835	100
847	100
859	100
871	100
883	100
895	100
907	100
919	100
931	100
943	100
955	100
967	100
979	100
991	100
1003	100
1015	100
1027	100
1039	100
1051	100
1063	100
1075	100
1087	100
1099	100
1111	100
1123	100
1135	100
1147	100
1159	100
1171	100
1183	100
1195	100
1207	100
1219	100
1231	100
1243	100
1255	100
1267	100
1279	100
1291	100
1303	100
1315	100
1327	100
1339	100
1351	100
1363	100
1375	100
1387	100
1399	100
1411	100
1423	100
1435	100
1447	100
1459	100
1471	100
1483	100
1495	100
1507	100
1519	100
1531	100
1543	100
1555	100
1567	100
1579	100
1591	100
1603	100
1615	100
1627	100
1639	100
1651	100
1663	100
1675	100
1687	100
1699	100
1711	100
1723	100
1735	100
1747	100
1759	100
1771	100
1783	100
1795	100
1807	100
1819	100
1831	100
1843	100
1855	100
1867	100
1879	100
1891	100
1903	100
1915	100
1927	100
1939	100

**%RELATIVE ABUNDANCE**

50	15.0 - 40.0% of the base peak	21.4	
75	30.0 - 60.0% of the base peak	50.5	
95	Base peak, 100% relative abundance	100.0	
96	5.0 - 9.0% of the base peak	9.0	
173	Less than 1.0% of the base peak	<del>0</del>	
174	Greater than 50.0% of the base peak	89.3	
175	5.0 - 9.0% of mass 174	8.1 ✓	(9.0) <sup>1</sup>
176	Greater than 95.0%, but less than 101.0% of mass 174	86.2 ✓	(96.5) <sup>1</sup>
177	5.0 - 9.0% of mass 176	7.7 ✓	(8.9) <sup>2</sup>

<sup>1</sup> Value in parenthesis is % mass 174.

<sup>2</sup> Value in parenthesis is % mass 176.

**THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING  
SAMPLES, BLANKS AND STANDARDS.**

Tune OK RV

[illegible]

INITIAL CALIBRATION DATA  
Volatile HSL Compounds

Case No.:..... 4183  
Contractor..... Versar  
Contract No.:..... 68-01-6756

Instrument ID:.... HP  
Calibration Date:.. 04/18/85

Minimum RF for SPCC is 0.300 Maximum %RSD for CCC is 30%

LABORATORY ID	29569	29589	29570	29571	29572				
COMPOUND	RF 20	RF 50	RF 100	RF 150	RF 200	RF	% RSD	CCC*	SPCC**
Chloromethane	1.780	1.462	1.312	1.312	1.294	1.432	12.867	**	
Bromomethane	1.670	1.569	1.416	1.416	1.342	1.482	8.059		
Vinyl Chloride	1.918	1.821	1.743	1.743	1.727	1.790	4.001	*	
Chloroethane	1.173	1.162	1.089	1.089	1.100	1.123	3.288		
Methylene Chloride	2.263	1.960	1.767	1.767	1.752	1.902	10.320		
Acetone	1.390	0.949	0.637	0.637	0.533	0.829	37.784	only effects LOQ	
Carbon Disulfide	2.783	3.369	3.207	3.207	2.891	3.091	7.077		
1,1-Dichloroethene	1.110	1.047	0.978	0.978	0.962	1.015	5.523	*	
1,1-Dichloroethane	2.315	2.279	2.026	2.026	2.032	2.136	6.192	**	
Trans-1,2-Dichloroethene	1.125	1.264	1.167	1.167	1.113	1.167	4.549		
Chloroform	3.368	3.151	2.943	2.943	2.983	3.077	5.337	*	
1,2-Dichloroethane	3.178	3.201	3.099	3.099	2.898	3.095	3.446		
2-butanone	0.280	0.190	0.149	0.149	0.125	0.179	30.706	only effects LOQ	
1,1,1-Trichloroethane	0.710	0.729	0.676	0.676	0.637	0.685	4.634		
Carbon Tetrachloride	0.810	0.778	0.695	0.695	0.686	0.733	6.963		
Vinyl Acetate	0.825	0.741	0.668	0.668	0.628	0.706	9.916		
Bromodichloroethane	0.440	0.467	0.445	0.445	0.423	0.444	3.142		
1,2-Dichloropropane	0.088	0.088	0.079	0.079	0.078	0.082	5.552	*	
Trans-1,3-Dichloropropene	0.263	0.273	0.272	0.272	0.259	0.268	2.126		
Trichloroethene	0.390	0.378	0.337	0.337	0.330	0.354	6.965		
Dibromochloromethane	0.470	0.474	0.437	0.437	0.433	0.450	3.992		
1,1,2-Trichloroethane	0.278	0.293	0.277	0.277	0.277	0.280	2.307		
Benzene	0.880	0.907	0.895	0.895	0.910	0.897	1.182		
cis-1,3-Dichloropropene	0.940	1.026	0.982	0.982	0.943	0.975	3.220		
2-chloroethylvinylether	0.198	0.217	0.198	0.198	0.199	0.202	3.791		
Bromoform	0.363	0.397	0.405	0.405	0.380	0.390	4.222	**	
2-Hexanone	0.943	0.612	0.452	0.452	0.367	0.565	36.219	only effects LOQ	
4-Methyl-2-Pentanone	0.583	0.484	0.458	0.458	0.408	0.478	12.110		
Tetrachloroethene	0.563	0.533	0.477	0.477	0.462	0.502	7.710		
1,1,1,2-Tetrachloroethane	0.653	0.627	0.635	0.635	0.594	0.629	3.033	**	
Toluene	0.813	0.828	0.783	0.783	0.766	0.794	2.830	*	
Chlorobenzene	1.258	1.246	1.159	1.159	1.167	1.197	3.724	**	
Ethylbenzene	2.250	2.250	2.154	2.154	2.033	2.168	3.701	*	
Styrene	1.193	1.188	1.129	1.129	1.117	1.151	2.799		
Total Xylenes	0.583	0.579	0.542	0.542	0.544	0.558	3.343		

RF -Response Factor (subscript is the amount of ug/l)

CCC -Calibration Check Compounds (\*)

SPCC -System Performance Check Compounds (\*\*)

RF -Average Response Factor

%RSD -Percent Relative Standard Deviation

FORM VI

OK-Pr.

000420

## INITIAL CALIBRATION DATA - SEMIVOLATILE HSL COMPOUNDS

CASE NO. 4248  
 CONTRACT NO. 68-01-6756  
 CALIBRATION DATE: 05-10-85  
 MINIMUM MEAN RF FOR-SPCC IS 0.05  
 MAXIMUM XRSO FOR CCC IS 30%

CONTRACT LAB: VERSAR  
 INSTRUMENT IDENTIFIER: FINN1

\* : CCC  
 \*\* - SPCC

COMPOUND	RF 20NG 3380	RF 50NG 3379	RF 80NG 3378	RF 120NG 3377	RF 160NG 3376	MEAN RF	XRSO
N-NITROSODIMETHYLAMINE	1.619	1.796	1.902	1.922	2.025	1.853	7.4
PHENOL	2.298	2.617	2.727	2.347	2.372	2.472	6.8*
ANILINE	2.330	2.798	3.024	2.611	2.615	2.676	8.5*
BIS(2-CHLOROETHYL)ETHER	1.906	2.147	2.317	2.020	2.029	2.084	6.6
2-CHLOROPHENOL	1.381	1.511	1.609	1.470	1.438	1.482	5.1
1,3-DICHLOROBENZENE	1.439	1.516	1.581	1.432	1.405	1.475	4.4
1,4-DICHLOROBENZENE	0.924	0.949	0.989	0.912	0.931	0.941	2.8*
BENZYL ALCOHOL	1.335	1.563	1.683	1.667	1.772	1.604	9.3
1,2-DICHLOROBENZENE	1.357	1.423	1.493	1.369	1.339	1.396	4.0
2-METHYLPHENOL	1.407	1.533	1.620	1.535	1.510	1.521	4.4
BIS(2-CHLOROISOPROPYL)ETHER	4.689	5.345	5.399	4.647	4.415	4.899	8.1
4-METHYLPHENOL	1.720	1.907	2.013	1.809	1.886	1.867	5.2
N-NITROSO-DI-N-PROPYLAMINE	1.981	2.286	2.447	2.385	2.554	2.331*	8.3
HEXACHLOROETHANE	0.652	0.723	0.769	0.714	0.775	0.726	6.1
NITROBENZENE	0.473	0.555	0.585	0.525	0.540	0.536	6.9
ISOPHORONE	0.861	0.988	1.027	0.946	0.970	0.958	5.8*
2-NITROPHENOL	0.225	0.216	0.228	0.215	0.227	0.222	2.5*
2,4-DIMETHYLPHENOL	0.331	0.371	0.404	0.390	0.408	0.381	7.3
BENZOIC ACID	0.178	0.246	0.262	0.241	0.229	0.231	12.4
BIS(2-CHLOROETHOXY)METHANE	0.520	0.589	0.637	0.595	0.610	0.590	6.5*
2,4-DICHLOROPHENOL	0.256	0.286	0.298	0.279	0.281	0.280	4.9*
1,2,4-TRICHLOROBENZENE	0.270	0.288	0.294	0.272	0.268	0.279	3.7
NAPHTHALENE	0.963	0.992	0.964	0.769	0.691	0.876	13.9
4-CHLOROANILINE	0.290	0.414	0.470	0.443	0.433	0.410	15.2
HEXACHLOROBUTADIENE	0.132	0.138	0.143	0.129	0.123	0.133	5.1*
4-CHLORO-3-METHYLPHENOL	0.303	0.356	0.381	0.363	0.377	0.356	7.5*
2-METHYLNAPHTHALENE	0.517	0.556	0.572	0.514	0.488	0.529	5.7
HEXACHLOROCYCLOPENTADIENE	0.189	0.260	0.309	0.298	0.295	0.270*	16.2*
2,4,6-TRICHLOROPHENOL	0.328	0.375	0.387	0.363	0.373	0.365	5.4*
2,4,5-TRICHLOROPHENOL	0.320	0.369	0.391	0.361	0.363	0.361	6.3
2-CHLORONAPHTHALENE	1.020	1.133	1.149	1.048	1.001	1.070	5.5
2-NITROANILINE	0.480	0.614	0.667	0.667	0.772	0.640	14.8
DIMETHYL PHTHALATE	1.129	1.264	1.315	1.197	1.181	1.217	5.3
ACENAPHTHYLENE	1.699	1.713	1.716	1.490	1.396	1.603	8.3
3-NITROANILINE	0.240	0.382	0.708	0.727	0.846	0.581	39.4
ACENAPHTHENE	1.058	1.116	1.164	1.044	0.988	1.074	5.6*
2,4-DINITROPHENOL	0.087	0.166	0.192	0.191	0.202	0.167**	25.0*
4-NITROPHENOL	0.206	0.298	0.348	0.343	0.387	0.316**	19.5
DIBENZOFURAN	1.412	1.531	1.545	1.339	1.245	1.414	8.0
2,4-DINITROTOLUENE	0.338	0.415	0.437	0.419	0.427	0.407	8.6
2,6-DINITROTOLUENE	0.268	0.303	0.325	0.303	0.315	0.303	6.3
DIETHYLPHTHALATE	1.194	1.322	1.403	1.262	1.216	1.279	5.9
4-CHLOROPHENYLPHENYLETHER	0.511	0.546	0.549	0.496	0.491	0.519	4.6
FLUORENE	1.096	1.188	1.210	1.090	1.054	1.128	5.3
4-NITROANILINE	0.198	0.227	0.309	0.382	0.451	0.313	30.0
4,6-DINITRO-2-METHYLPHENOL	0.127	0.198	0.213	0.200	0.186	0.185	16.2*
N-NITROSODIPHENYLAMINE	0.678	0.768	0.831	0.774	0.775	0.765	6.4*
4-BROMOPHENYL-PHENYLETHER	0.162	0.182	0.184	0.173	0.187	0.178	5.0
HEXACHLOROBENZENE	0.211	0.220	0.223	0.201	0.213	0.214	3.5
PENTACHLOROPHENOL	0.059	0.097	0.105	0.102	0.099	0.092	18.2*
PHENANTHRENE	0.946	1.015	1.004	0.891	0.852	0.942	6.7
ANTHRACENE	0.827	0.927	0.948	0.821	0.794	0.863	7.1
DI-N-BUTYLPHTHALATE	1.121	1.262	1.216	1.008	0.901	1.102	12.0
FLUORANTHENE	0.789	0.879	0.851	0.615	0.595	0.746	15.9*
BENZIDINE	0.917	0.006	0.010	0.019	0.041	0.019	63.4*
PYRENE	2.471	3.257	3.272	2.608	2.453	2.812	13.2
BUTYL BENZYL PHTHALATE	0.972	1.288	1.332	1.243	1.357	1.238	11.2
3,3'-DICHLOROBENZIDINE	0.231	0.177	0.210	0.221	0.274	0.223	14.0
BENZO(A)ANTHRACENE	1.486	1.658	1.791	1.670	1.734	1.668	6.1
BIS(2-ETHYLHEXYL)PHTHALATE	1.573	1.736	1.793	1.770	1.806	1.735	4.8
CHRYSENE	1.442	1.569	1.683	1.566	1.604	1.573	4.9
DI-N-OCTYL PHTHALATE	2.422	3.026	3.312	3.211	3.122	3.018	10.3*
BENZO(B)FLUORANTHENE	1.710	1.943	2.036	2.095	2.033	1.963	6.9
BENZO(K)FLUORANTHENE	1.472	1.770	1.886	1.585	2.082	1.759	12.2
BENZO(A)PYRENE	1.263	1.565	1.699	1.605	1.676	1.561	10.0*
INDENO(1,2,3-CD)PYRENE	1.103	1.142	1.300	1.098	1.018	1.132	8.2
DIBENZ(A,H)ANTHRACENE	0.961	1.062	1.182	0.616	0.283	0.821	39.9
BENZO(GHI)PERYLENE	1.009	1.095	1.185	0.743	0.180	0.842	43.0

000421

only  
eff  
LO

ORIGINAL  
(Red)Continuing Calibration Check  
Volatile HSL CompoundsCase No.:.....4248  
Contractor:.....Versar  
Contract No.:.....68-01-6756  
Instrument ID:.....HPCalibration Date:.....4/25/85  
Time:.....1330  
Laboratory ID:.....29624  
Initial Calibration Date: 04/18/85

Minimum RF for SPCC is 0.300    Maximum XD for CCC is 25%

COMPOUND	RF	RF 50	XD	CCC	SPCC
Chloromethane	1.432	1.327	7.337		**
Bromomethane	1.482	1.344	9.336		
Vinyl Chloride	1.790	1.562	12.749	*	
Chloroethane	1.123	1.001	10.824		
Methylene Chloride	1.902	1.939	-1.972		
Acetone	0.829	0.672	18.945		
Carbon Disulfide	3.091	2.552	17.439		
1,1-Dichloroethane	1.015	1.115	-9.881	*	
1,1-Dichloroethane	2.136	2.477	-15.983		**
Trans-1,2-Dichloroethane	1.167	1.371	-17.481		
Chloroform	3.077	3.134	-1.843	*	
1,2-Dichloroethane	3.095	3.214	-3.855		
2-butanone	0.179	0.202	-13.102		
1,1,1-Trichloroethane	0.685	0.669	2.393		
Carbon Tetrachloride	0.733	0.564	23.042		
Vinyl Acetate	0.706	0.810	-14.774		
Bromodichloroethane	0.444	0.431	2.899		
1,2-Dichloropropane	0.082	0.100	-21.704	✓ *	
Trans-1,3-Dichloropropene	0.268	0.308	-15.026		
Trichloroethene	0.354	0.357	-0.772		
Dibromochloromethane	0.450	0.434	3.584		
1,1,2-Trichloroethane	0.280	0.309	-10.318		
Benzene	0.897	1.050	-17.039		
cis-1,3-Dichloropropene	0.975	1.046	-7.319		
2-chloroethylvinylether	0.202	0.239	-18.454		
Bromoform	0.390	0.410	-5.155		**
2-Hexanone	0.565	0.677	-19.802		
4-Methyl-2-Pentanone	0.478	0.648	-35.612		
Tetrachloroethane	0.502	0.686	-36.608		
1,1,2,2-Tetrachloroethane	0.629	0.726	-15.501		**
Toluene	0.794	0.920	-15.816	*	
Chlorobenzene	1.197	1.212	-1.216		**
Ethylbenzene	2.168	2.467	-13.795	*	
Styrene	1.151	1.375	-19.444		
Total Xylenes	0.558	0.780	-39.793	+ only effed LOQ.	

all  
OK

RF50 -Response Factor from daily standard at 50 ug/l

XD -Percent Difference

RF -Average Response Factor from initial calibration Form VI

CCC -Calibration Check Compounds (\*)

SPCC -System Performance Check Compounds (\*\*)

Form VII

000422

Continuing Calibration Check  
Volatile HSL Compounds

Case No.:.....4248 Calibration Date:.....4/18/85  
Contractor:.....Versar Time:.....0930  
Contract No.:.....68-01-6756 Laboratory ID:.....29634  
Instrument ID:.....HP Initial Calibration Date: 04/18/85

Minimum RF for SPCC is 0.300 Maximum XD for CCC is 25%

COMPOUND	RF	RF 50	XD	CCC	SPCC
Chloromethane	1.432	1.419	0.912		**
Bromomethane	1.482	1.453	1.983		
Vinyl Chloride	1.790	1.725	3.644	*	
Chloroethane	1.123	1.079	3.875		
Methylene Chloride	1.902	2.072	-8.967		
Acetone	0.829	0.869	-4.817		
Carbon Disulfide	3.091	2.817	8.865		
1,1-Dichloroethene	1.015	1.239	-22.101	*	
1,1-Dichloroethane	2.136	2.704	-26.612	LOQ	**
Trans-1,2-Dichloroethene	1.167	1.418	-21.508		
Chloroform	3.077	3.725	-21.048	*	
1,2-Dichloroethane	3.095	3.509	-13.387		
2-butanone	0.179	0.200	-11.982		
1,1,1-Trichloroethane	0.685	0.734	-7.091		
Carbon Tetrachloride	0.733	0.536	26.863	LOQ	
Vinyl Acetate	0.706	0.800	-13.357		
Bromodichloroethane	0.444	0.446	-0.481		
1,2-Dichloropropane	0.082	0.102	-24.138	*	
Trans-1,3-Dichloropropene	0.268	0.313	-16.893		
Trichloroethene	0.354	0.363	-2.465		
Dibromochloromethane	0.450	0.426	5.361		
1,1,2-Trichloroethane	0.280	0.332	-18.529		
Benzene	0.897	1.114	-24.173		
cis-1,3-Dichloropropene	0.975	1.063	-9.063		
2-chloroethylvinylether	0.202	0.234	-15.976		
Bromoform	0.390	0.433	-11.054		**
2-Hexanone	0.565	0.631	-11.662		
4-Methyl-2-Pentanone	0.478	0.608	-27.241	only LOQ	
Tetrachloroethene	0.502	0.617	-22.868		
1,1,2,2-Tetrachloroethane	0.629	0.716	-13.910		**
Toluene	0.794	0.959	-20.725	*	
Chlorobenzene	1.197	1.167	2.542		**
Ethylbenzene	2.168	2.388	-10.151	*	
Styrene	1.151	1.346	-16.925		
Total Xylenes	0.558	0.716	-28.323	only LOQ	

RF50 -Response Factor from daily standard at 50 ug/l

XD -Percent Difference

CCC -Calibration Check Compounds (\*)

RF -Average Response Factor from initial calibration Form VI

SPCC -System Performance Check Compounds (\*\*)

Form VII

00042

CALIBRATION CHECK - SEMIVOLATILE HSL COMPOUNDS  
CASE NO. 4248 CONTRACT LAB: VERSAR  
CONTRACT NO. 68-01-6756 INSTRUMENT IDENTIFIER: FINN1  
CALIBRATION DATE: 05-10-85  
STANDARD FILE: 3390  
DATE: 5-10-85 TIME: 16:07:00  
MAXIMUM % D FOR CCC IS 25

ORIGINAL  
(Red)

\*: CCC  
\*: SPCC

COMPOUND	MEAN RF(I)	RF(O)	% D
N-NITROSODIMETHYLAMINE	1.853	1.796	-3.076
PHENOL	2.472	2.617	5.859*
ANILINE	2.676	2.798	4.567
BIS(2-CHLOROETHYL)ETHER	2.084	2.147	3.020
2-CHLOROPHENOL	1.482	1.511	1.975
1,3-DICHLOROBENZENE	1.475	1.516	2.827
1,4-DICHLOROBENZENE	0.941	0.949	0.871*
BENZYL ALCOHOL	1.604	1.563	-2.562
1,2-DICHLOROBENZENE	1.396	1.423	1.919
2-METHYLPHENOL	1.521	1.533	0.796
BIS(2-CHLOROISOPROPYL)ETHER	4.899	5.345	9.107
4-METHYLPHENOL	1.867	1.907	2.128
N-NITROSO-DI-N-PROPYLAMINE	2.331	2.286**	-1.931
HEXACHLOROETHANE	0.726	0.723	-0.504
NITROBENZENE	0.536	0.555	3.614
ISOPHORONE	0.958	0.988	3.097
2-NITROPHENOL	0.222	0.216	-2.947*
2,4-DIMETHYLPHENOL	0.381	0.371	-2.608
BENZOIC ACID	0.231	0.246	6.444
BIS(2-CHLOROETHOXY)METHANE	0.590	0.589	-0.143
2,4-DICHLOROPHENOL	0.280	0.286	2.133*
1,2,4-TRICHLOROBENZENE	0.279	0.288	3.525
NAPHTHALENE	0.876	0.992	13.227
4-CHLOROANILINE	0.410	0.414	0.955
HEXACHLOROBTADIENE	0.133	0.138	3.712*
4-CHLORO-3-METHYLPHENOL	0.356	0.356	-0.066*
2-METHYLNAPHTHALENE	0.529	0.556	5.047
HEXACHLOROCYCLOPENTADIENE	0.270	0.260**	-3.824
2,4,6-TRICHLOROPHENOL	0.365	0.375	2.586*
2,4,5-TRICHLOROPHENOL	0.361	0.369	2.286
2-CHLORONAPHTHALENE	1.070	1.133	5.878
2-NITROANILINE	0.640	0.614	-4.009
DIMETHYL PHTHALATE	1.217	1.264	3.816
ACENAPHTHYLENE	1.603	1.713	6.887
3-NITROANILINE	0.581	0.382	-34.167-only 10A
ACENAPHTHENE	1.074	1.116	3.893*
2,4-DINITROPHENOL	0.167	0.166**	-1.137
4-NITROPHENOL	0.316	0.298**	-5.835
DIBENZOFURAN	1.414	1.531	8.238
2,4-DINITROTOLUENE	0.407	0.415	1.830
2,6-DINITROTOLUENE	0.303	0.303	0.106
DIETHYLPHTHALATE	1.279	1.322	3.352
4-CHLOROPHENYLPHENYLETHER	0.519	0.546	5.310
FLUORENE	1.128	1.188	5.355
4-NITROANILINE	0.313	0.227	-27.455
4,6-DINITRO-2-METHYLPHENOL	0.185	0.198	6.980
N-NITROSODIPHENYLAMINE	0.765	0.768	0.359*
4-BROMOPHENYL-PHENYLETHER	0.178	0.182	2.479
HEXACHLOROBENZENE	0.214	0.220	2.949
PENTACHLOROPHENOL	0.092	0.097	4.537*
PHENANTHRENE	0.942	1.015	7.829
ANTHRACENE	0.863	0.927	7.414
DI-N-BUTYLPHTHALATE	1.102	1.262	14.586
FLUORANTHENE	0.746	0.879	17.902*
BENZIDINE	0.019	0.005	-65.918-D. Unreliable
PYRENE	2.812	3.257	15.815
BUTYL BENZYL PHTHALATE	1.238	1.288	4.005
3,3'-DICHLOROBENZIDINE	0.223	0.177	-20.354
BENZO(A)ANTHRACENE	1.668	1.658	-0.601
BIS(2-ETHYLHEXYL)PHTHALATE	1.735	1.736	0.018
CHRYSENE	1.573	1.569	-0.255
DI-N-OCTYL PHTHALATE	3.018	3.026	0.250*
BENZO(B)FLUORANTHENE	1.963	1.943	-1.036
BENZO(K)FLUORANTHENE	1.759	1.770	0.611
BENZO(A)PYRENE	1.561	1.565	0.220*
INDENO(1,2,3-CD)PYRENE	1.132	1.142	0.877
DIBENZ(A,H)ANTHRACENE	0.821	1.062	29.365
BENZO(GHI)PERYLENE	0.842	1.095	29.975

000424

CALIBRATION CHECK - SEMIVOLATILE HSL COMPOUNDS  
CASE NO. 4248 CONTRACT LAB: VERSAR  
CONTRACT NO. 68-01-6756 INSTRUMENT IDENTIFIER: FINN1  
CALIBRATION DATE: 05-10-85  
STANDARD FILE: 3398  
DATE: 05-13-85 TIME: 12:28:00  
MAXIMUM % D FOR CCC- IS 25

COMPOUND	MEAN RF(I)	RF(O)	% D
N-NITROSODIMETHYLAMINE	1.853	1.952	5.369
PHENOL	2.472	2.734	10.588*
ANILINE	2.676	2.995	11.951
BIS(2-CHLOROETHYL)ETHER	2.084	2.297	10.247
2-CHLOROPHENOL	1.482	1.493	0.742
1,3-DICHLOROBENZENE	1.475	1.488	0.922
1,4-DICHLOROBENZENE	0.941	0.945	0.377*
BENZYL ALCOHOL	1.604	1.673	4.285
1,2-DICHLOROBENZENE	1.396	1.402	0.388
2-METHYLPHENOL	1.521	1.576	3.622
BIS(2-CHLOROISOPROPYL)ETHER	4.899	5.803	18.448
4-METHYLPHENOL	1.867	1.949	4.413
N-NITROSO-DI-N-PROPYLAMINE	2.331	2.519**	8.056
HEXACHLOROETHANE	0.726	0.719	-1.074
NITROBENZENE	0.536	0.564	5.275
ISOPHORONE	0.958	1.003	4.685
2-NITROPHENOL	0.222	0.208	-6.322*
2,4-DIMETHYLPHENOL	0.381	0.379	-0.586
BENZOIC ACID	0.231	0.224	-3.227
BIS(2-CHLOROETHOXY)METHANE	0.590	0.622	5.378
2,4-DICHLOROPHENOL	0.280	0.265	-5.398*
1,2,4-TRICHLOROBENZENE	0.279	0.262	-6.032
NAPHTHALENE	0.876	0.939	7.215
4-CHLOROANILINE	0.410	0.433	5.708
HEXACHLOROBUTADIENE	0.133	0.121	-9.229*
4-CHLORO-3-METHYLPHENOL	0.356	0.357	0.129*
2-METHYLNAPHTHALENE	0.529	0.538	1.620
HEXACHLOROCYCLOPENTADIENE	0.270	0.262**	-3.023
2,4,6-TRICHLOROPHENOL	0.365	0.337	-7.578*
2,4,5-TRICHLOROPHENOL	0.361	0.344	-4.662
2-CHLORONAPHTHALENE	1.070	1.076	0.577
2-NITROANILINE	0.640	0.653	2.072
DIMETHYL PHTHALATE	1.217	1.204	-1.090
ACENAPHTHYLENE	1.603	1.744	8.792
3-NITROANILINE	0.581	0.607	4.565
ACENAPHTHENE	1.074	1.080	0.616*
2,4-DINITROPHENOL	0.167	0.139**	-17.091
4-NITROPHENOL	0.316	0.242**	-23.520
DIBENZOFURAN	1.414	1.446	2.263
2,4-DINITROTOLUENE	0.407	0.390	-4.279
2,6-DINITROTOLUENE	0.303	0.294	-3.033
DIETHYLPHTHALATE	1.279	1.269	-0.818
4-CHLOROPHENYLPHENYLETHER	0.519	0.503	-3.042
FLUORENE	1.128	1.141	1.190
4-NITROANILINE	0.313	0.168	-46.434
4,6-DINITRO-2-METHYLPHENOL	0.185	0.150	-18.725
N-NITROSODIPHENYLAMINE	0.765	0.771	0.787*
4-BROMOPHENYL-PHENYLETHER	0.178	0.176	-1.175
HEXACHLOROBENZENE	0.214	0.211	-1.464
PENTACHLOROPHENOL	0.092	0.077	-16.469*
PHENANTHRENE	0.942	1.020	8.294
ANTHRACENE	0.863	0.929	7.647
DI-N-BUTYLPHTHALATE	1.102	1.192	8.227
FLUORANTHENE	0.746	0.508	-31.896*
BENZIDINE	0.019	0.009	-49.417
PYRENE	2.812	2.685	-4.544
BUTYL BENZYL PHTHALATE	1.238	1.064	-14.092
3,3'-DICHLOROBENZIDINE	0.223	0.195	-12.966
BENZO(A)ANTHRACENE	1.668	1.550	-7.062
BIS(2-ETHYLHEXYL)PHTHALATE	1.735	1.286	-25.888
CHRYSENE	1.573	1.494	-5.000
DI-N-OCTYL PHTHALATE	3.018	2.383	-21.039*
BENZO(B)FLUORANTHENE	1.963	2.082	6.051
BENZO(K)FLUORANTHENE	1.759	1.565	-11.035
BENZO(A)PYRENE	1.561	1.477	-5.436*
INDENO(1,2,3-CD)PYRENE	1.132	0.681	-39.796
DIBENZ(A,H)ANTHRACENE	0.821	0.691	-15.743
BENZO(GHI)PERYLENE	0.842	0.036	-95.708

\* = CCC  
\*\* = SPCC

only LOA  
ccc Failed  
corrective action taken  
out of control  
limits, system checked  
OK.

D.L unreliable

000425

D.L unreliable  
effect all sps  
except CA183 & CA11

ORIGINAL  
(Red)

CALIBRATION CHECK - SEMIVOLATILE HSL COMPOUNDS  
 CASE NO. 4248 CONTRACT NO. 68-01-6756 CONTRACT LAB: VERSAR  
 CALIBRATION DATE: 05-10-85 INSTRUMENT IDENTIFIER: FINN1  
 STANDARD FILE: 3412  
 DATE: 05-14-85 TIME: 10:20:00  
 MAXIMUM % D FOR CCC IS ~~20~~  
 25

COMPOUND	MEAN RF(I)	RF(O)	% D
N-NITROSODIMETHYLAMINE	1.853	1.858	0.291
PHENOL	2.472	2.478	0.246*
ANILINE	2.676	2.692	0.599
BIS(2-CHLOROETHYL)ETHER	2.084	2.007	-3.696
2-CHLOROPHENOL	1.482	1.443	-2.592
1,3-DICHLOROBENZENE	1.475	1.467	-0.508
1,4-DICHLOROBENZENE	0.941	0.937	-0.472*
BENZYL ALCOHOL	1.604	1.482	-7.596
1,2-DICHLOROBENZENE	1.396	1.391	-0.405
2-METHYLPHENOL	1.521	1.432	-5.873
BIS(2-CHLOROISOPROPYL)ETHER	4.899	4.595	-6.204
4-METHYLPHENOL	1.867	1.815	-2.796
N-NITROSO-DI-N-PROPYLAMINE	2.331	2.247* *	-3.606
HEXACHLOROETHANE	0.726	0.669	-7.964
NITROBENZENE	0.536	0.565	5.531
ISOPHORONE	0.958	0.933	-2.608
2-NITROPHENOL	0.222	0.208	-6.351*
2,4-DIMETHYLPHENOL	0.381	0.384	0.817
BENZOIC ACID	0.231	0.215	-7.136
BIS(2-CHLOROETHOXY)METHANE	0.590	0.586	-0.685
2,4-DICHLOROPHENOL	0.280	0.281	0.365*
1,2,4-TRICHLOROBENZENE	0.279	0.288	3.269
NAPHTHALENE	0.876	0.941	7.441
4-CHLOROANILINE	0.410	0.404	-1.558
HEXACHLOROBUTADIENE	0.133	0.142	6.424*
4-CHLORO-3-METHYLPHENOL	0.356	0.315	-11.516*
2-METHYLNAPHTHALENE	0.529	0.517	-2.293
HEXACHLOROCYCLOPENTADIENE	0.270	0.342* *	26.603
2,4,6-TRICHLOROPHENOL	0.365	0.385	5.406*
2,4,5-TRICHLOROPHENOL	0.361	0.382	5.841
2-CHLORONAPHTHALENE	1.070	1.130	5.563
2-NITROANILINE	0.640	0.593	-7.269
DIMETHYL PHTHALATE	1.217	1.212	-0.459
ACENAPHTHYLENE	1.603	1.754	9.430
3-NITROANILINE	0.581	0.483	-16.759
ACENAPHTHENE	1.074	1.074	-0.017*
2,4-DINITROPHENOL	0.167	0.151* *	-9.617
4-NITROPHENOL	0.316	0.249* *	-21.220
DIBENZOFURAN	1.414	1.422	0.523
2,4-DINITROTOLUENE	0.407	0.383	-5.828
2,6-DINITROTOLUENE	0.303	0.319	5.220
DIETHYLPHTHALATE	1.279	1.173	-8.289
4-CHLOROPHENYLPHENYLETHER	0.519	0.547	5.486
FLUORENE	1.128	1.123	-0.460
4-NITROANILINE	0.313	0.147	-53.099-only LOQ
4,6-DINITRO-2-METHYLPHENOL	0.185	0.174	-5.923
N-NITROSODIPHENYLAMINE	0.765	0.697	-8.923*
4-BROMOPHENYL-PHENYLETHER	0.178	0.192	7.973
HEXACHLOROBENZENE	0.214	0.242	13.275
PENTACHLOROPHENOL	0.092	0.097	4.389*
PHENANTHRENE	0.942	0.960	1.936
ANTHRACENE	0.863	0.915	6.013
DI-N-BUTYLPHTHALATE	1.102	1.117	1.366
FLUORANTHENE	0.746	0.675	-9.511*
BENZIDINE	0.019	0.004	-74.014-D.C. unreliable (all spls)
PYRENE	2.812	2.783	-1.028
BUTYL BENZYL PHTHALATE	1.238	0.840	-32.148
3,3'-DICHLOROBENZIDINE	0.223	0.226	1.548
BENZO(A)ANTHRACENE	1.668	1.606	-3.709
BIS(2-ETHYLHEXYL)PHTHALATE	1.735	1.047	-39.639-LOQ
CHRYSENE	1.573	1.541	-2.012
DI-N-OCTYL PHTHALATE	3.018	1.524	-49.500-out of control limits: system checked OK
BENZO(B)FLUORANTHENE	1.963	1.910	-2.739
BENZO(K)FLUORANTHENE	1.759	1.503	-14.534
BENZO(A)PYRENE	1.561	1.469	-5.886*
INDENO(1,2,3-CD)PYRENE	1.132	0.845	-25.345
DIBENZ(A,H)ANTHRACENE	0.821	0.772	-5.127
BENZO(GHI)PERYLENE	0.842	0.043	-94.801-D.C. unreliable

\* = CCC  
 \*\* = SPCC  
 all spls except CA1834

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# Pesticide Evaluation Standards Summary

Case No. 41248 Laboratory VERSAR  
 Contract No. 68-01-6756 Column DB-5  
 Date of Analysis 5-7-85 Instrument ID 1

## EVALUATION CHECK FOR LINEARITY

LABORATORY ID	P997	P996	P995	
PESTICIDE	CALIBRATION FACTOR EVAL. MIX A	CALIBRATION FACTOR EVAL. MIX B	CALIBRATION FACTOR EVAL. MIX C	% RSD ( $\leq 10\%$ )
ALDRIN	2370	2590	2910	10. ✓
ENDRIN	1830	1770	1810	2. ✓
4,4'-DDT	1440	1360	1460	4. ✓
DIBUTYL CHLORENDATE	1250	1260	1270	1. ✓

## EVALUATION CHECK FOR 4,4'-DDT/ENDRIN BREAKDOWN

220% OK

	PERCENT BREAKDOWN EXPRESSED AS TOTAL DEGRADATION			
	EVAL. MIX B	EVAL. MIX B	EVAL. MIX B	EVAL. MIX B
ENDRIN	13	14	17	
4,4'-DDT	0	0	0	
LABORATORY ID	P996	P996	P996	
TIME OF ANALYSIS	1843	0727	1622	

## EVALUATION OF RETENTION TIME SHIFT FOR DIBUTYLCHLORENDATE

all OK

SMO SAMPLE NO.	LAB ID	TIME OF ANALYSIS	PERCENT DIFF. *	SMO SAMPLE NO.	LAB ID	TIME OF ANALYSIS	PERCENT DIFF. *
	P997	1801	0		P994	0437	0.15
	P996	1843	.07	CA104 MSD		0520	.15
	P995	1926	.15	CA105		0602	.15
	P993	2008	—	CA106		0645	.07
	P994	2050	.15		P996	0727	.07
	P953	2133	.29	CA108		0809	.29
	P952	2215	.29	CA109		0852	.15
	P954	2258	.22	CA110		0934	.07
	P955	2340	.22	CA177		1017	.00
	P956	0023	.22	CA179		1059	.15
	P957	0105	.22		P993	1142	—
	P958	0147	.22	CA185		1224	.22
	P959	0230	.22	RB		1307	.07
CA104		0312	.22	CA181		1432	.07
CA104 MS		0355	.22		P996	1622	.22

\*  $\leq 2\%$  PACKED,  $\leq 0.3\%$  CAPILLARY

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